AD-A139 384 REVISION AND EXPERIMENTAL VERIFICATION OF THE HAZARD ASSESSMENT COMPUTER..(U) SOUTHWEST RESEARCH INST SAN ANTONIO TX F T DODGE ET AL. JUN 83 USCG-D-36-83 1/2

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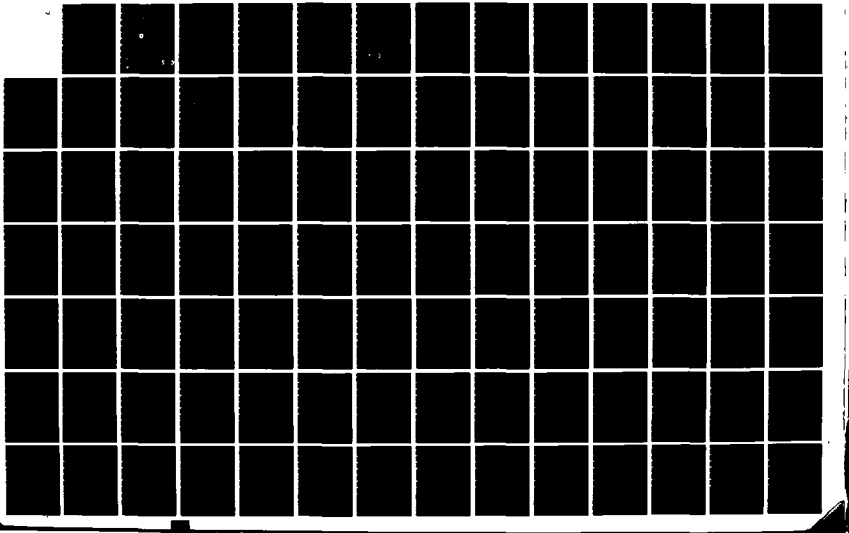

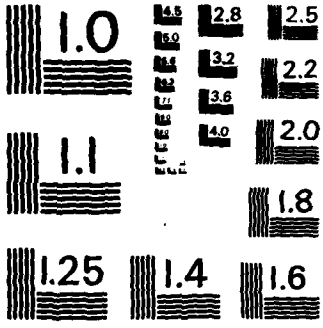

13

Report No. CG-D-36-83

AD A139384

REVISION AND EXPERIMENTAL VERIFICATION OF THE HAZARD ASSESSMENT COMPUTER SYSTEM MODELS FOR SPREADING, MOVEMENT, DISSOLUTION, AND DISSIPATION OF INSOLUBLE CHEMICALS SPILLED ONTO WATER: TEST DATA VOLUME

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J. T. PARK
J. C. BUCKINGHAM
R. J. MAGOTT

FINAL REPORT
JUNE 1983

Prepared for:

U.S. Department of Transportation
United States Coast Guard

Office of Research and Development
Washington, D.C. 20593

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16. Abstract

Computerized models are developed to predict the spreading, movement, evaporation, and dissolution of floating slicks formed by accidental spills of insoluble chemicals. Separate models are developed for continuous and instantaneous spills. The waterway can be a river, channel, lake, or coastal water. The models emphasize the dynamics of the thick slick (i.e., the gravity-viscous spreading phase) since the thick slick contains nearly all the spilled chemical and represents the most prolonged hazard.

Predictions of the spreading models are compared to results of instantaneous and continuous spill tests conducted in a large laboratory basin and a laboratory channel. The evaporation and dissolution predictions are compared to wind tunnel and wind-wave tunnel tests. Agreement of the models and the tests is generally good.

17. Key Words		18. Distribution Statement
Chemical Spills	Evaporation	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161
Waterways	Dissolution	
Floating Slicks	Dissipation	
Slick Movement	Spreading	

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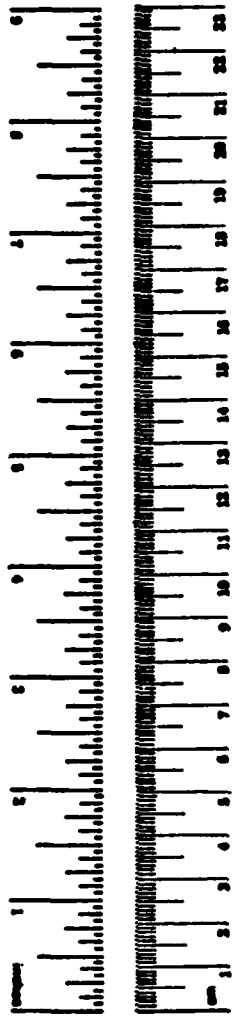
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

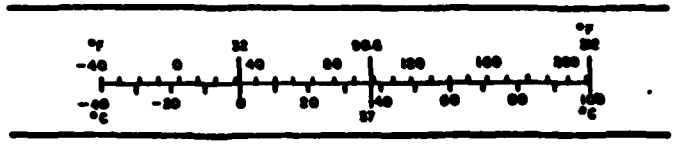
Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures. Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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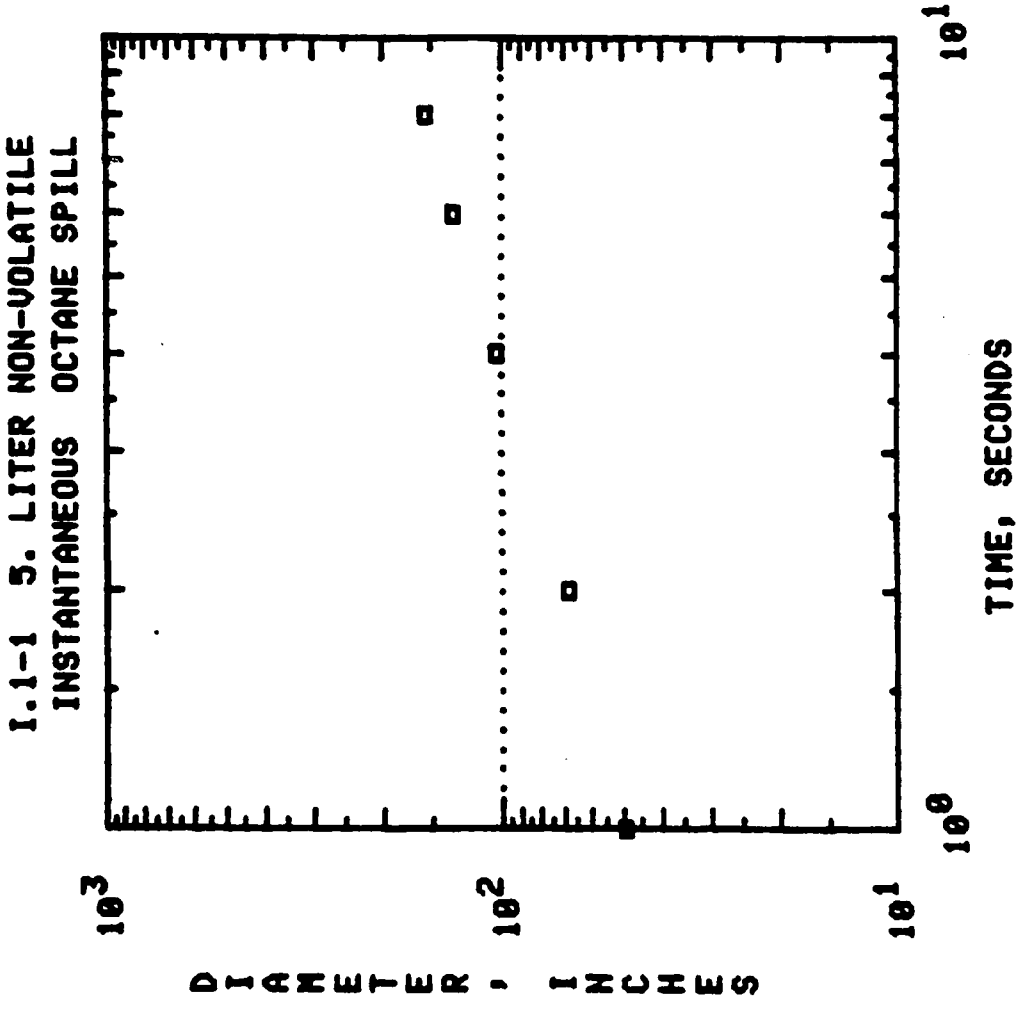
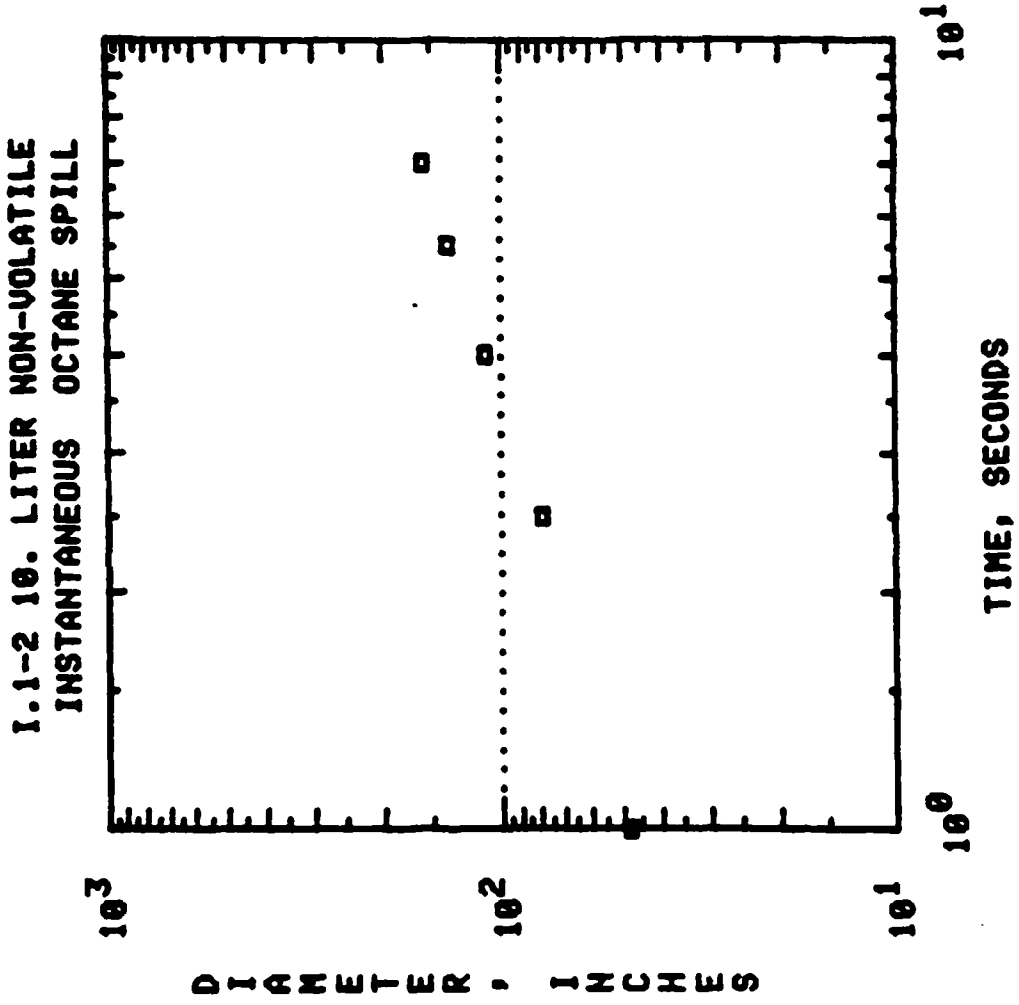
APPENDIX A

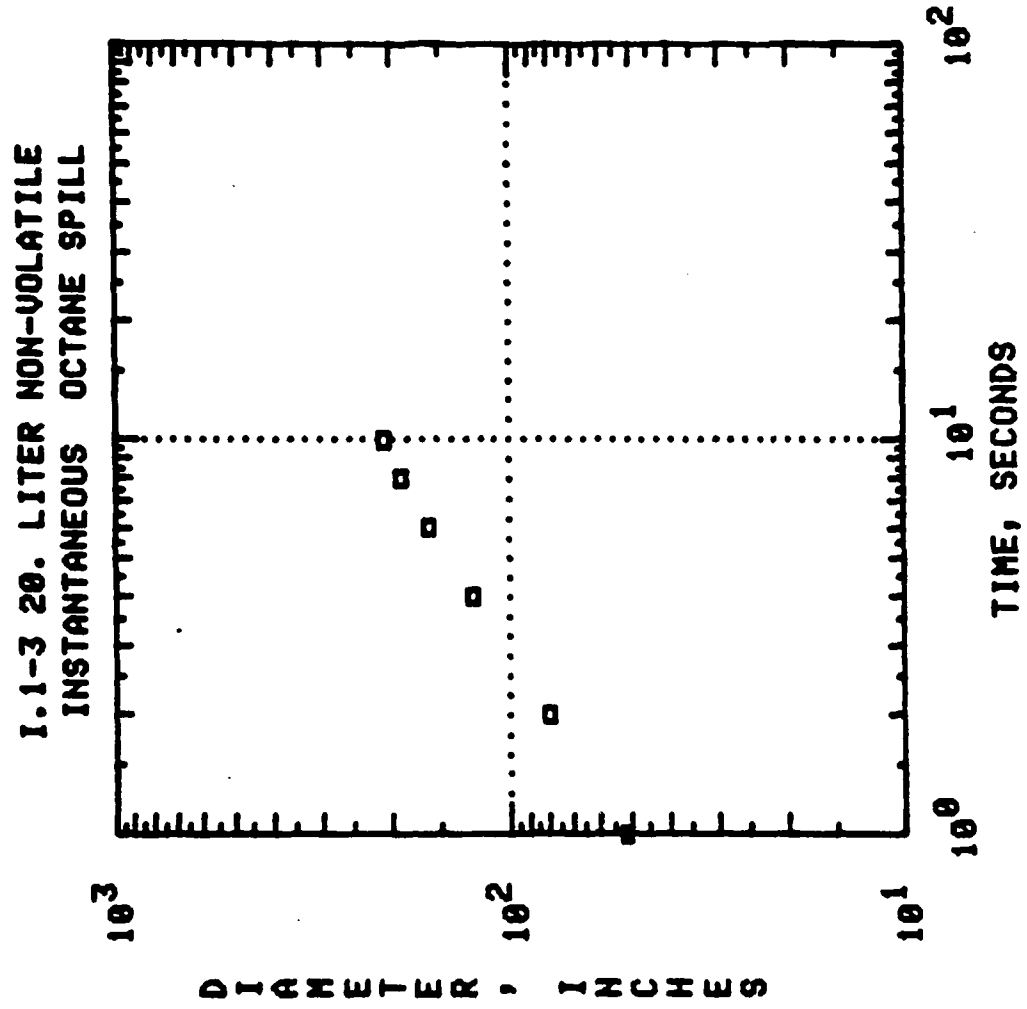
SPREADING TEST SERIES I -
NON-VOLATILE INSTANTANEOUS SPILLS IN BASIN

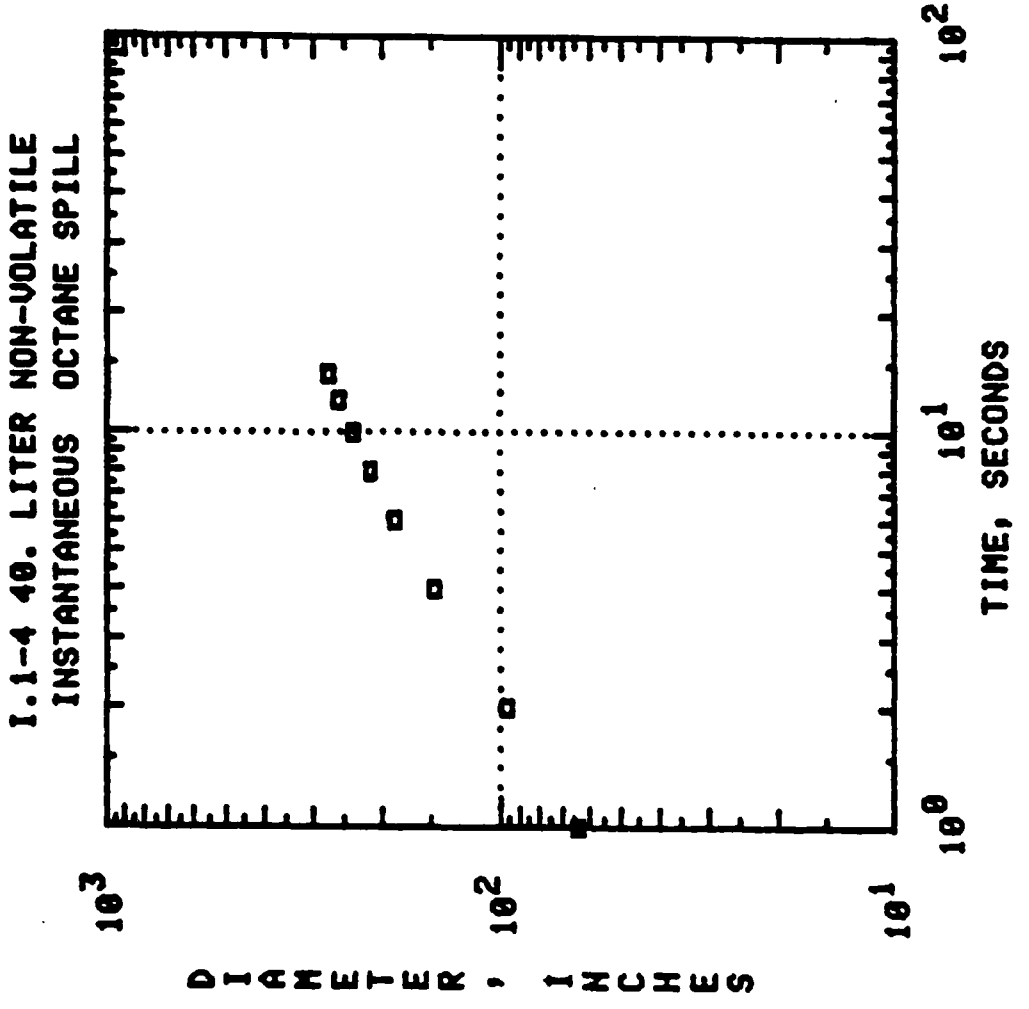
SUMMARY OF TEST CONDITIONS FOR
SPREADING TEST SERIES I -
NON-VOLATILE INSTANTANEOUS SPILLS IN BASIN

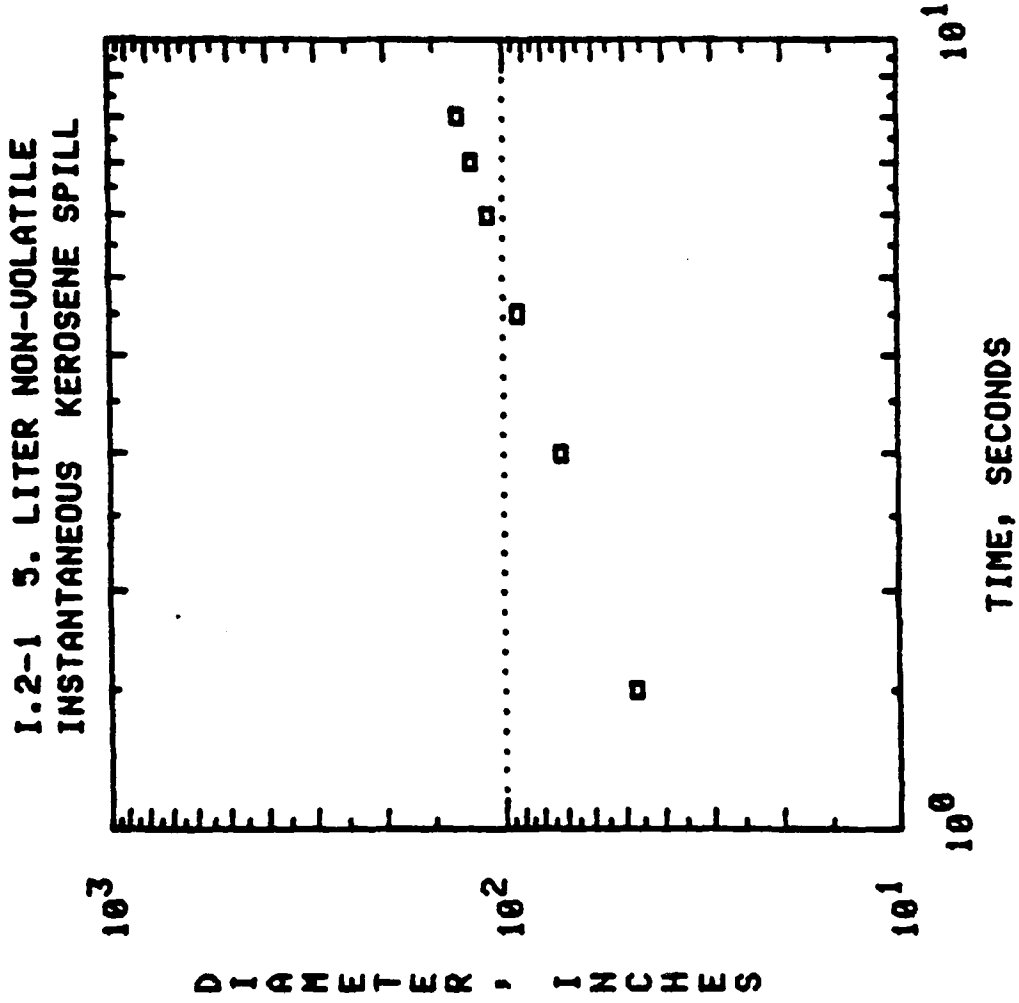
Run Number	Chemical	Specific Gravity	σ_{sp} Coef.	Spill Diameter (cm)	Spill Volume (liters)
I.1-1	Octane	0.703	0.3	20.3	5
I.1-2				30.5	10
I.1-3				40.6	20
I.1-4				61.0	40
I.2-1	Kerosene	0.795	-2.7	20.3	5
I.2-2				30.5	10
I.2-3				40.6	20
I.2-4				61.0	40
I.3-1	n-Hexanol	0.819	39.75	20.3	5
I.3-2				30.5	10
I.3-3				40.6	20
I.3-4				61.0	40
I.4-1	Naphtha	0.860	7.8	20.3	5
I.4-2				30.5	10
I.4-3				40.6	20
I.4-4				61.0	40
I.4-5				61.0	60
I.5-1	m-Xylene	0.864	7.0	20.3	5
I.5-2				30.5	10
I.5-3				40.6	20
I.5-4				61.0	40

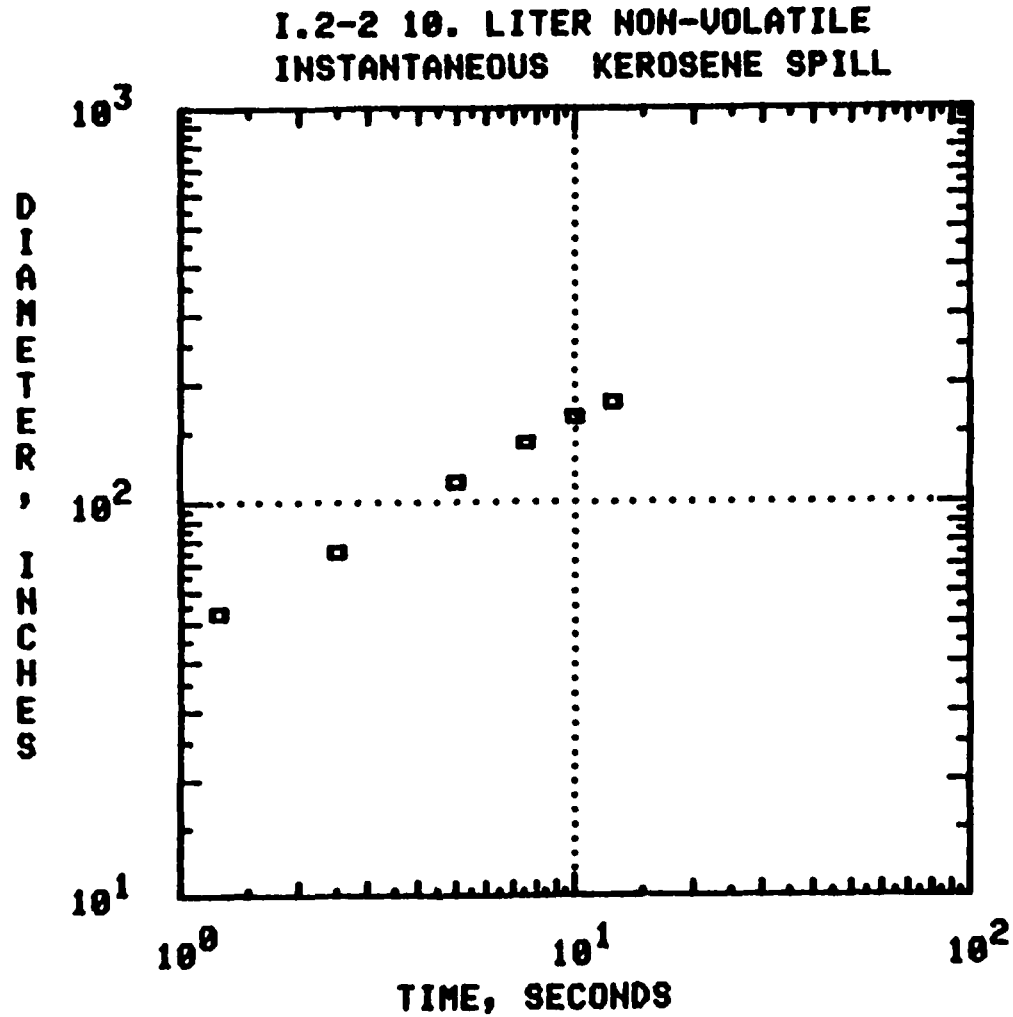

I.1-1 5. LITER NON-VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1

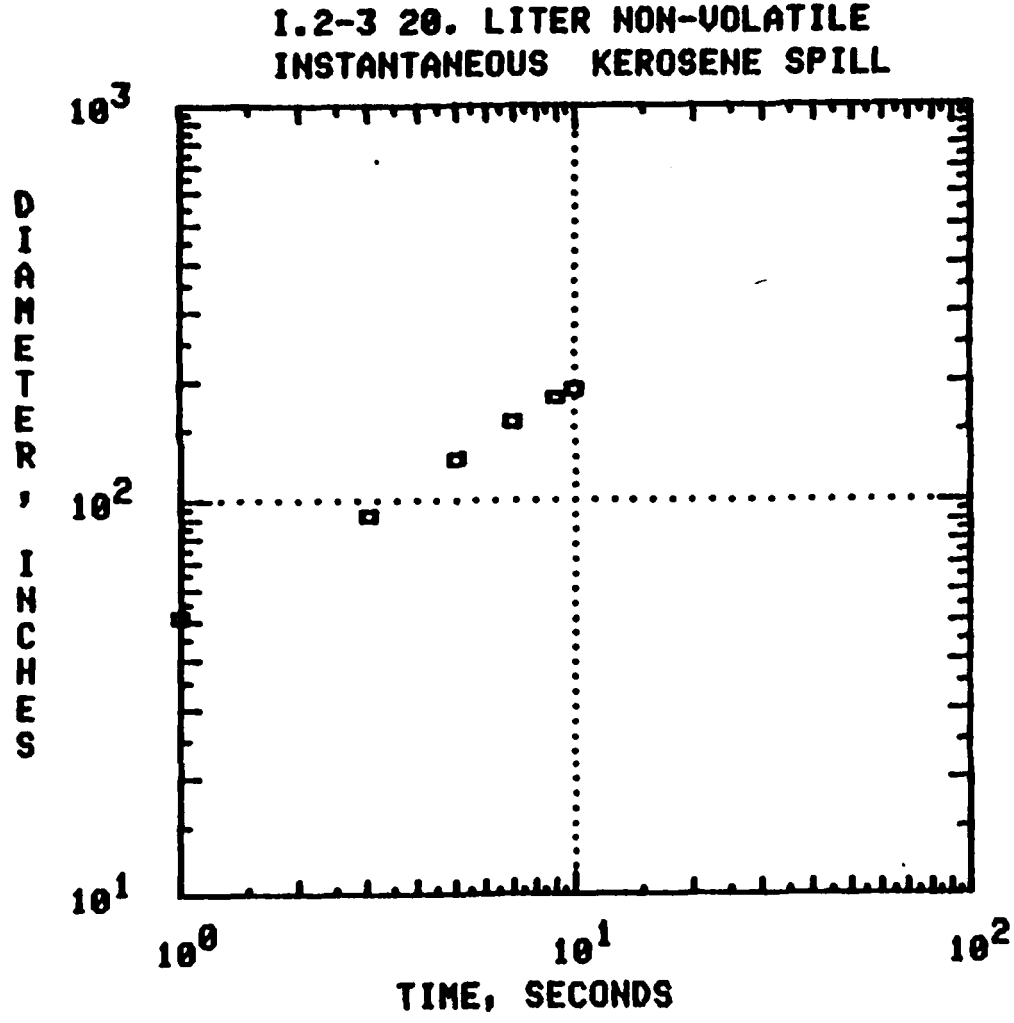

1.1-2 10. LITER NON-VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1

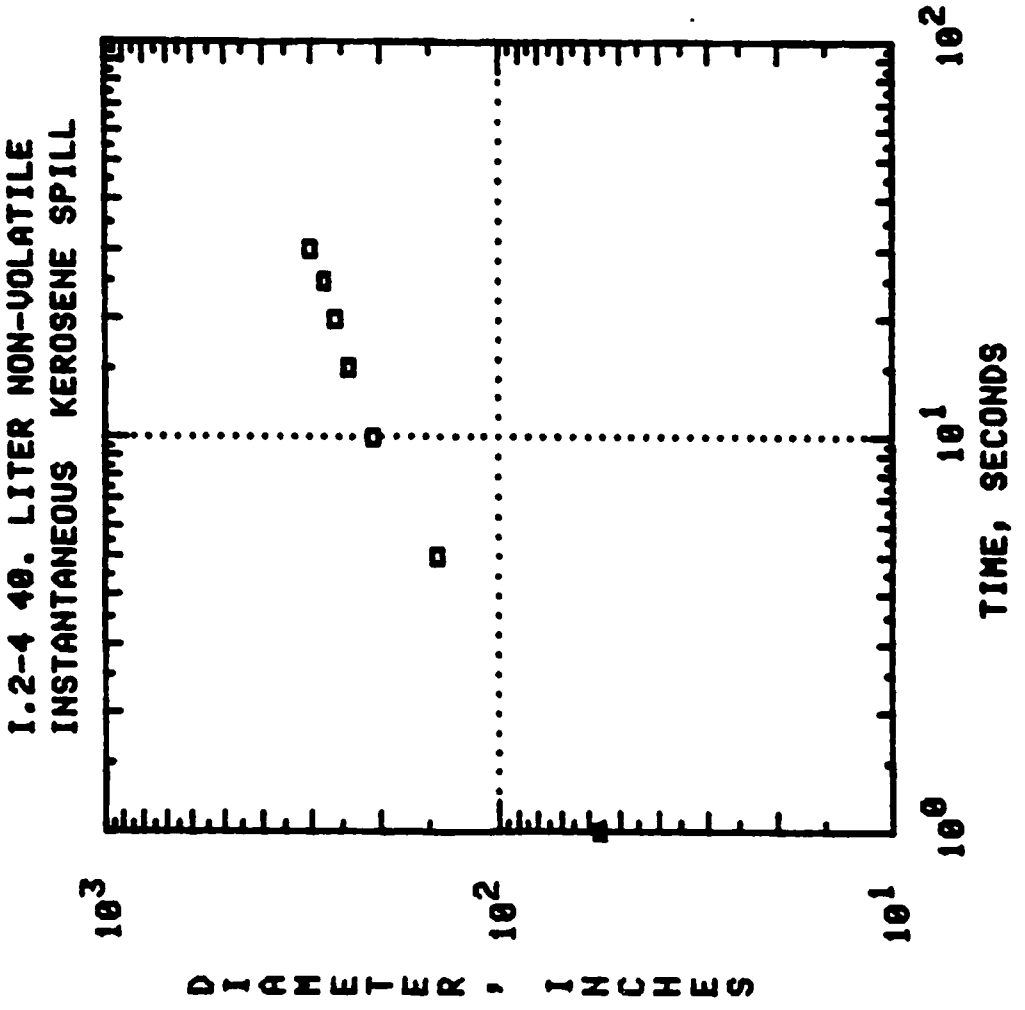

1.1-3 20. LITER NON-VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

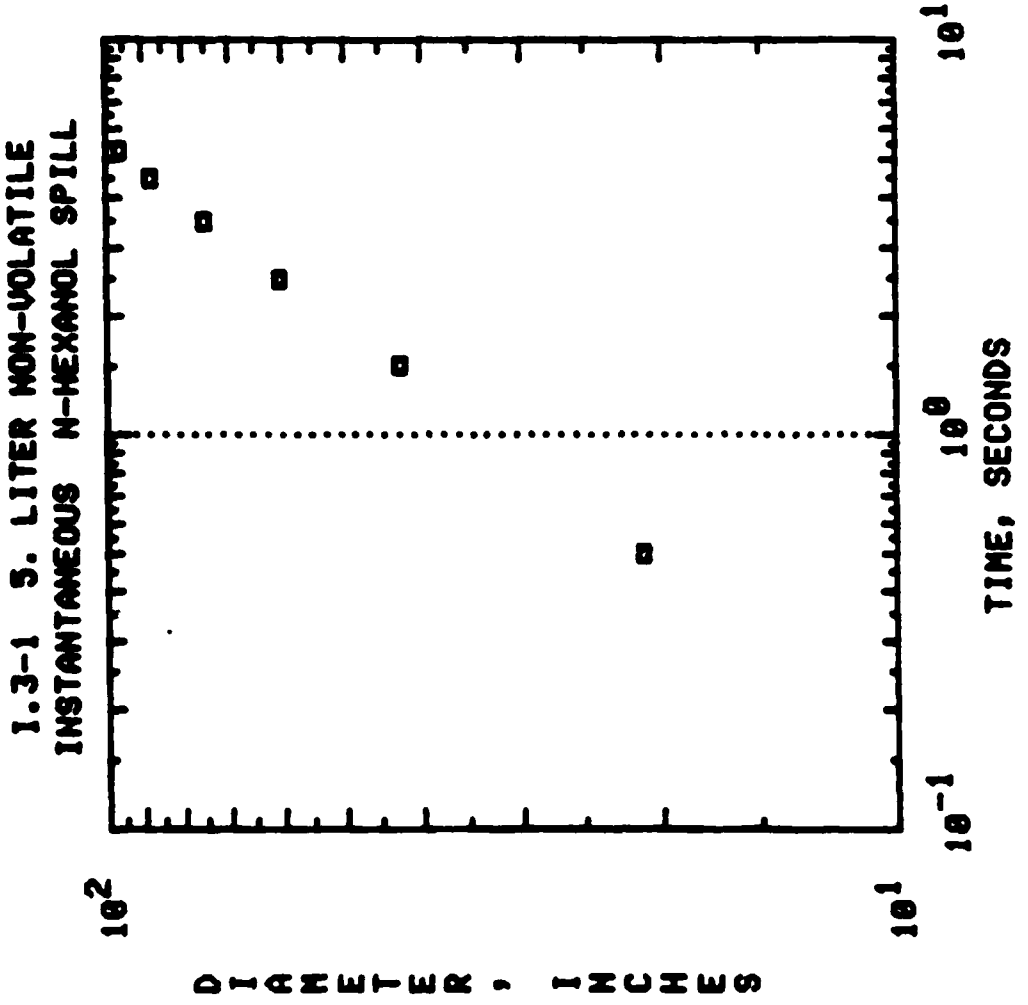

I.1-4 40. LITER NON-VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

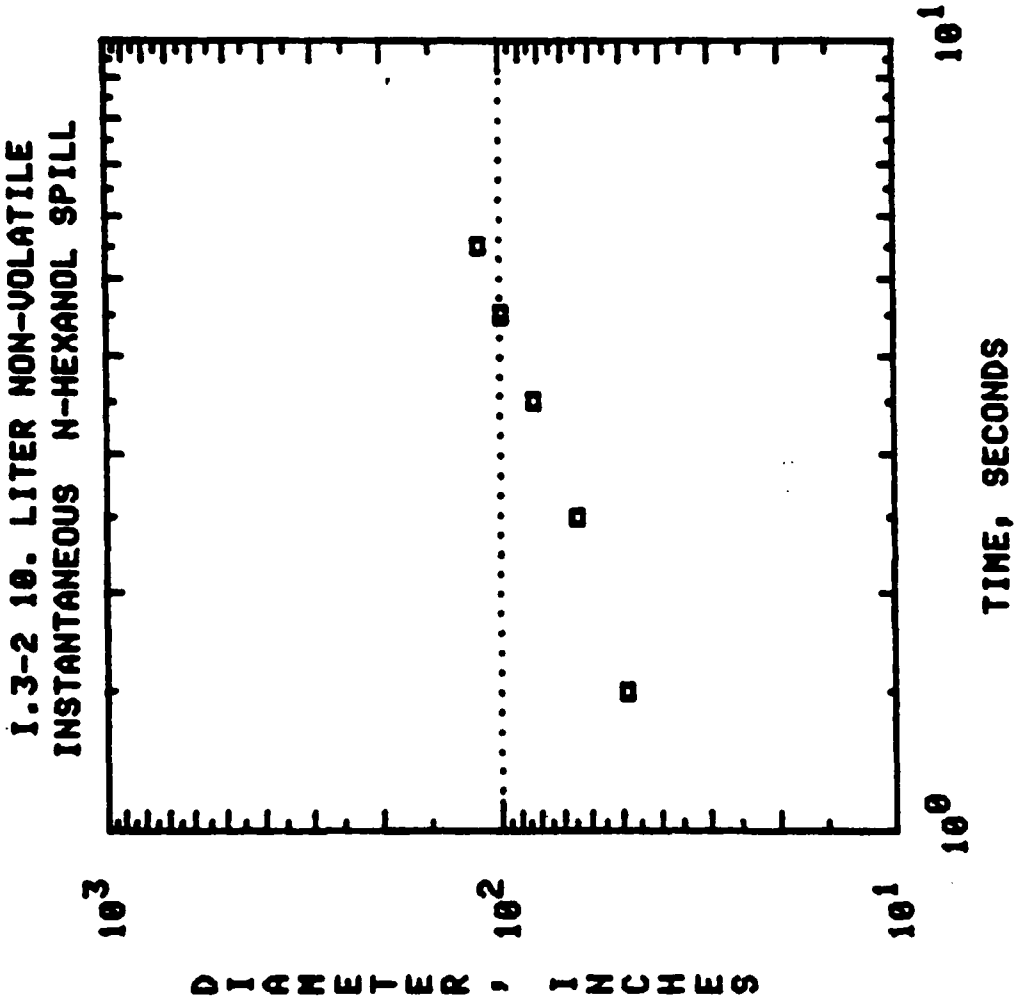

I.2-1 5. LITER NON-VOLATILE
INSTANTANEOUS KEROSENE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1

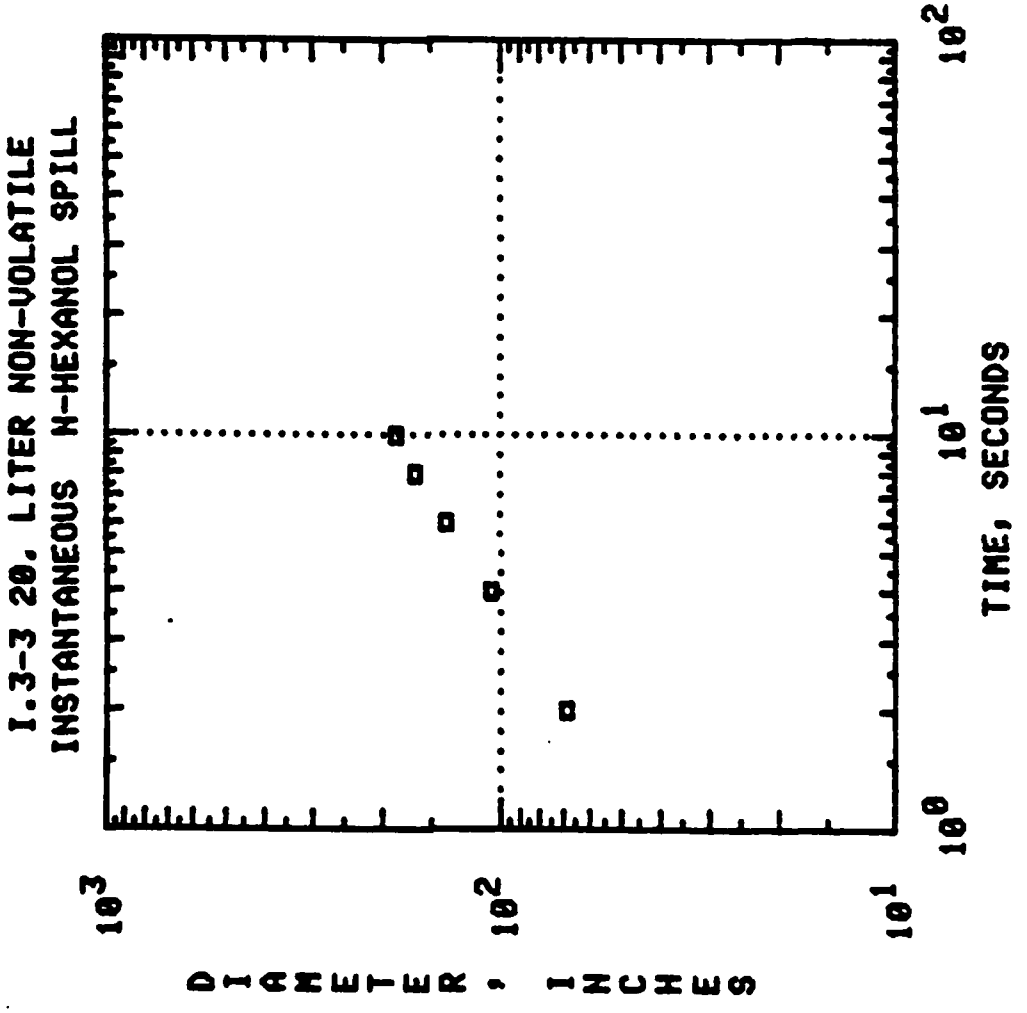

I.2-2 10. LITER NON-VOLATILE
INSTANTANEOUS KEROSENE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

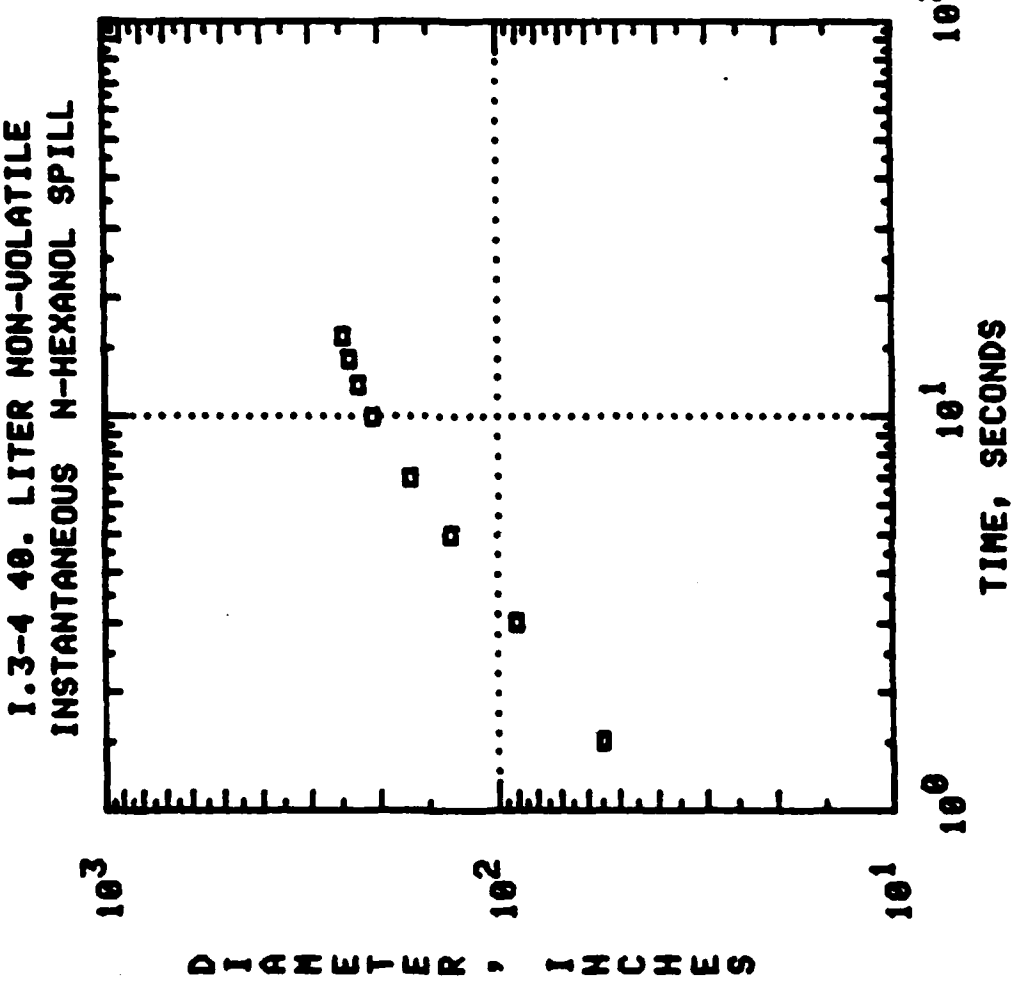

I.2-3 20. LITER NON-VOLATILE
INSTANTANEOUS KEROSENE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

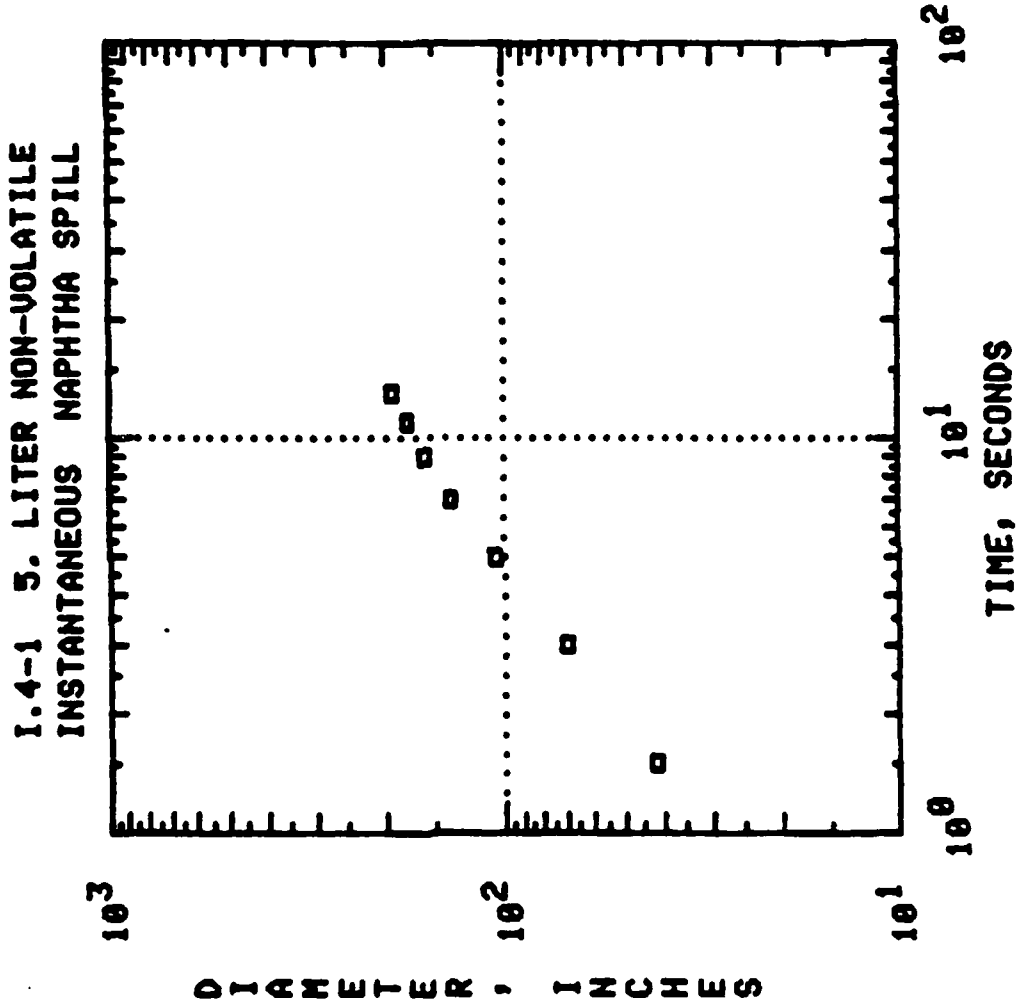

I.2-4 40. LITER NON-VOLATILE
INSTANTANEOUS KEROSENE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

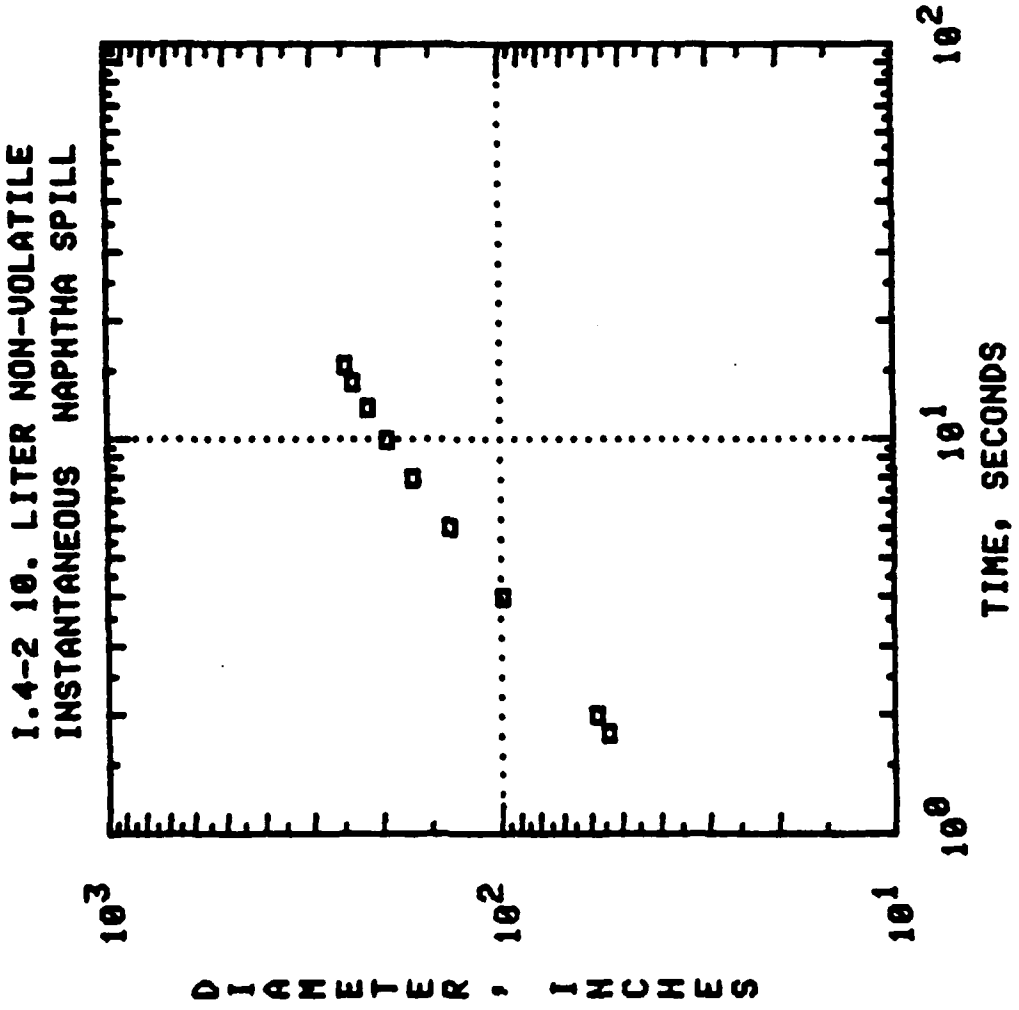

1.3-1 5. LITER NON-VOLATILE
INSTANTANEOUS N-HEXANOL SPILL
DIAMETER - INCHES
TIME, SECONDS
10^2
10^1
10^{-1}
10^0
10^1

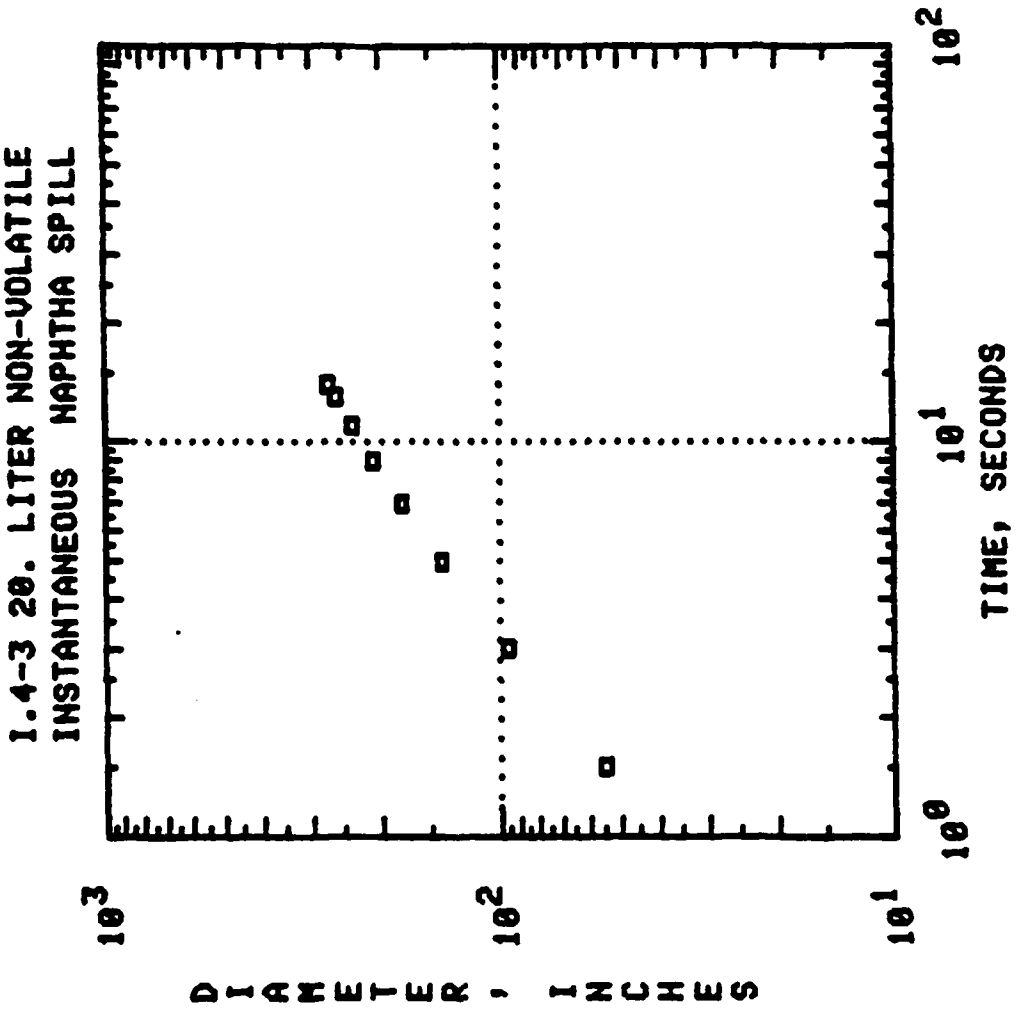

I.3-2 10. LITER NON-VOLATILE
INSTANTANEOUS N-HEXANOL SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1

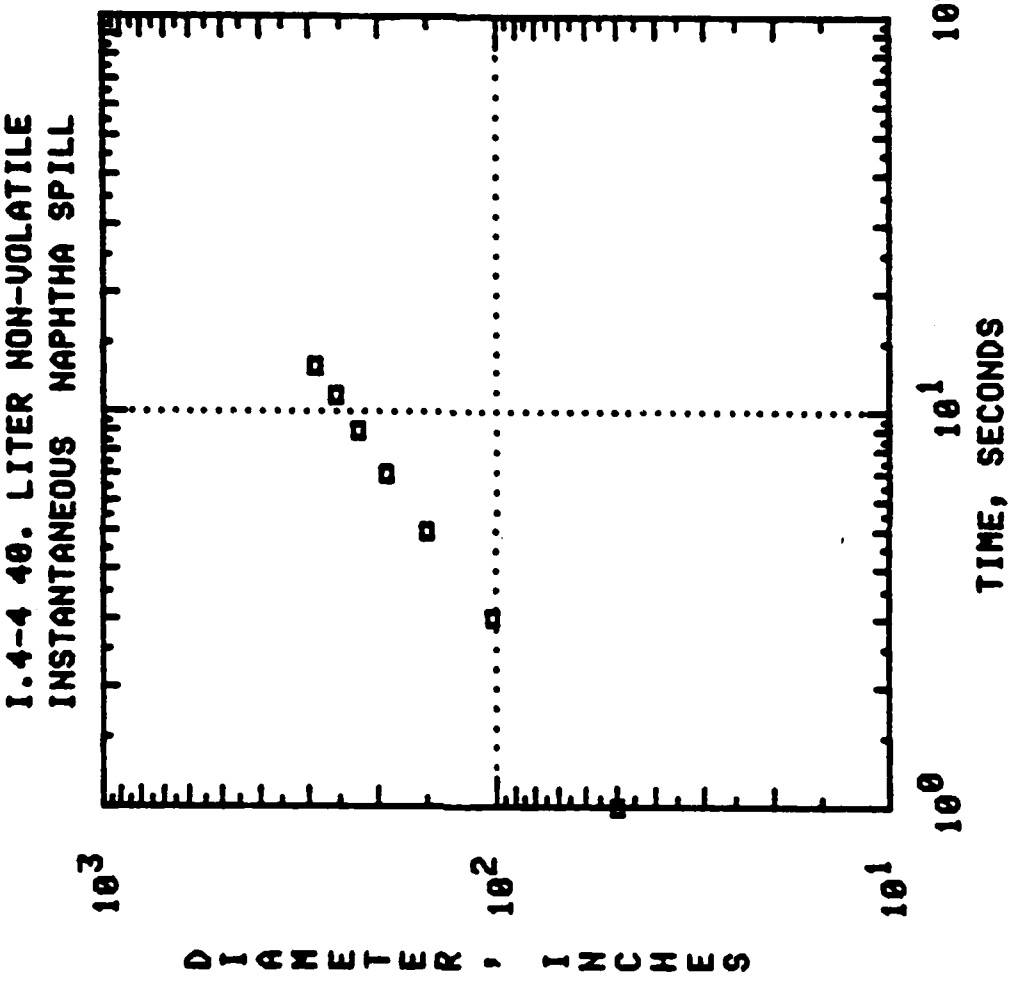

I.3-3 20. LITER NON-VOLATILE
INSTANTANEOUS N-HEXANOL SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

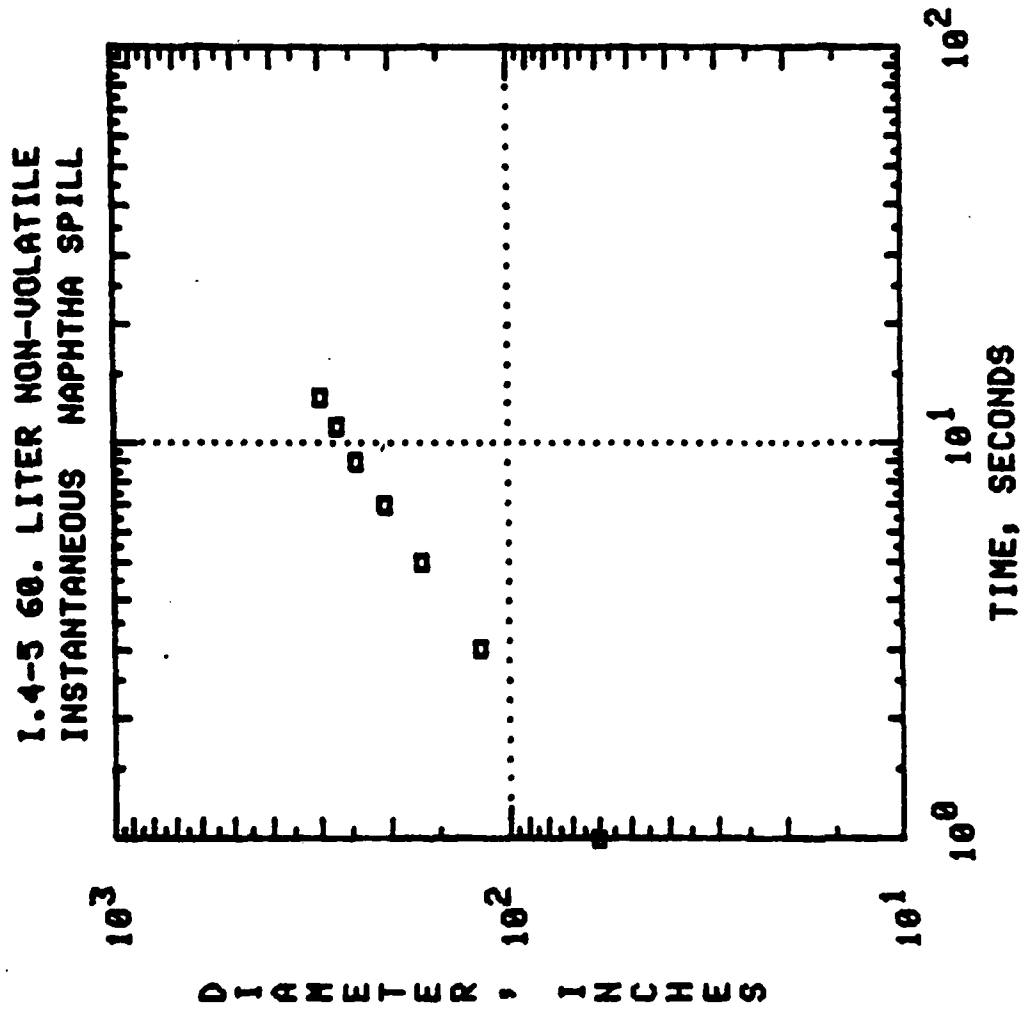

1.3-4 40. LITER NON-VOLATILE
INSTANTANEOUS N-HEXANOL SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

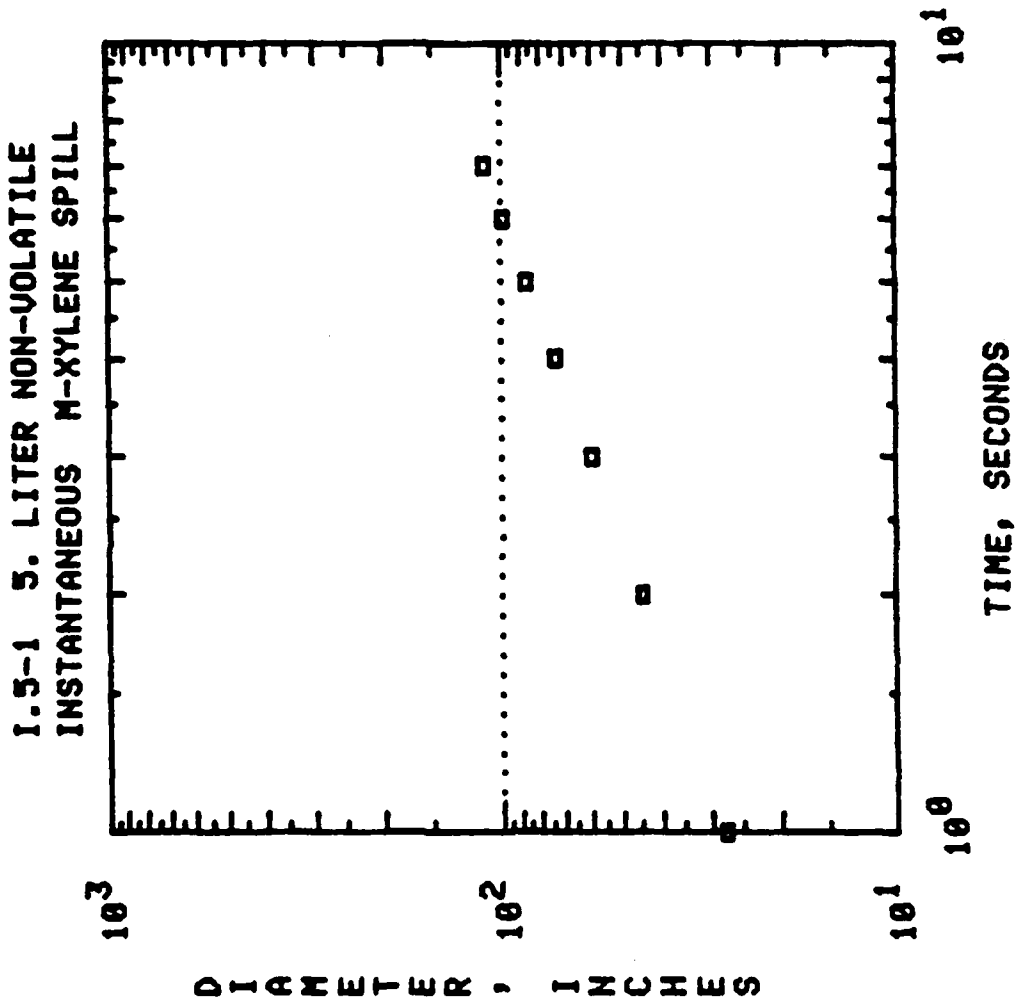

I.4-1 5. LITER NON-VOLATILE
INSTANTANEOUS NAPHTHA SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

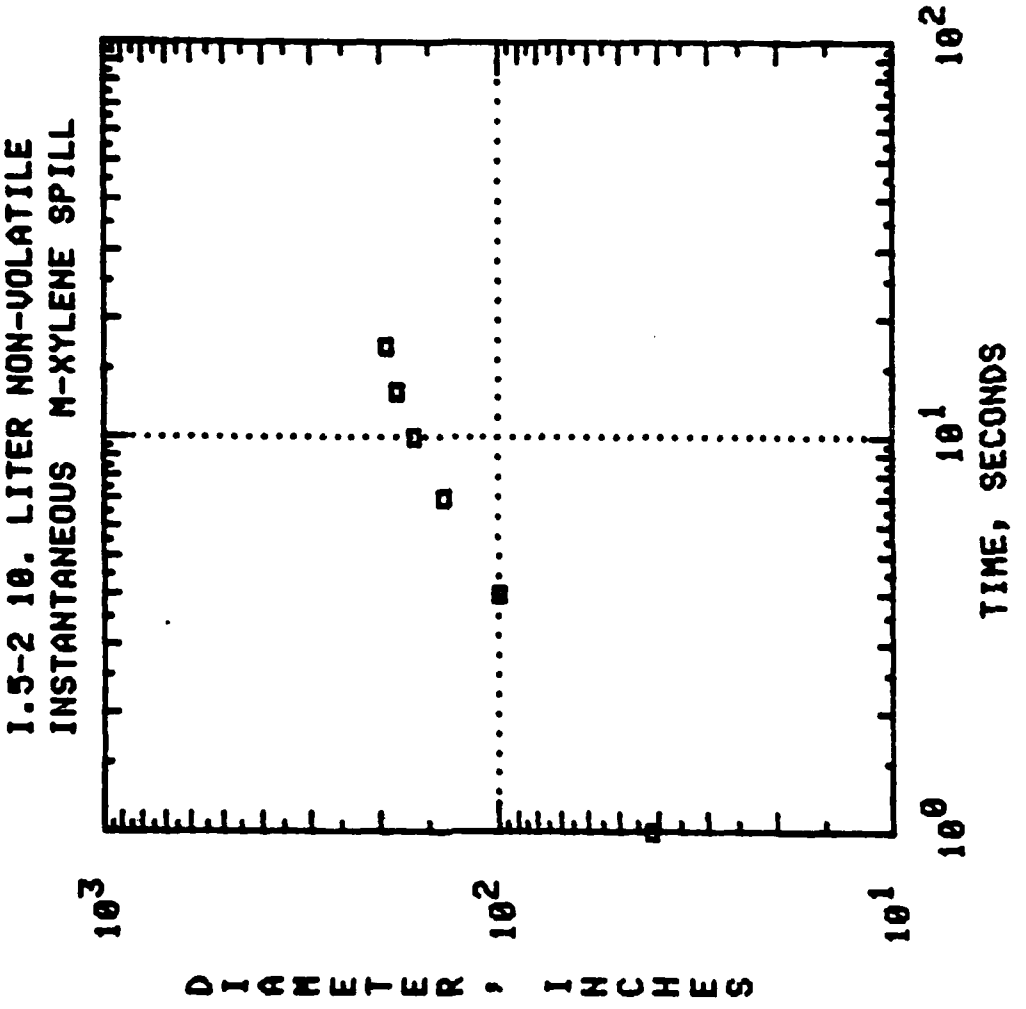

I.4-2 10. LITER NON-VOLATILE
INSTANTANEOUS NAPHTHA SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

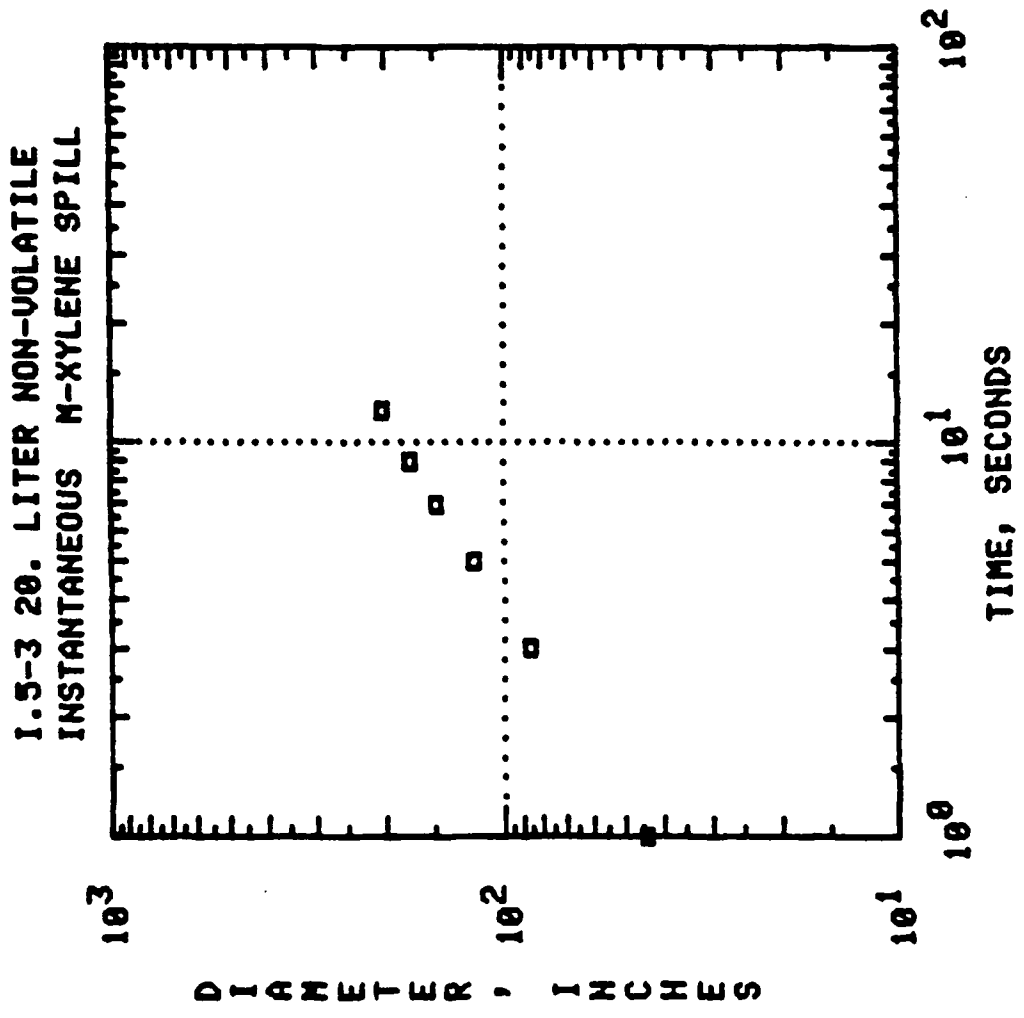

1.4-3 20. LITER NON-VOLATILE
INSTANTANEOUS NAPHTHA SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

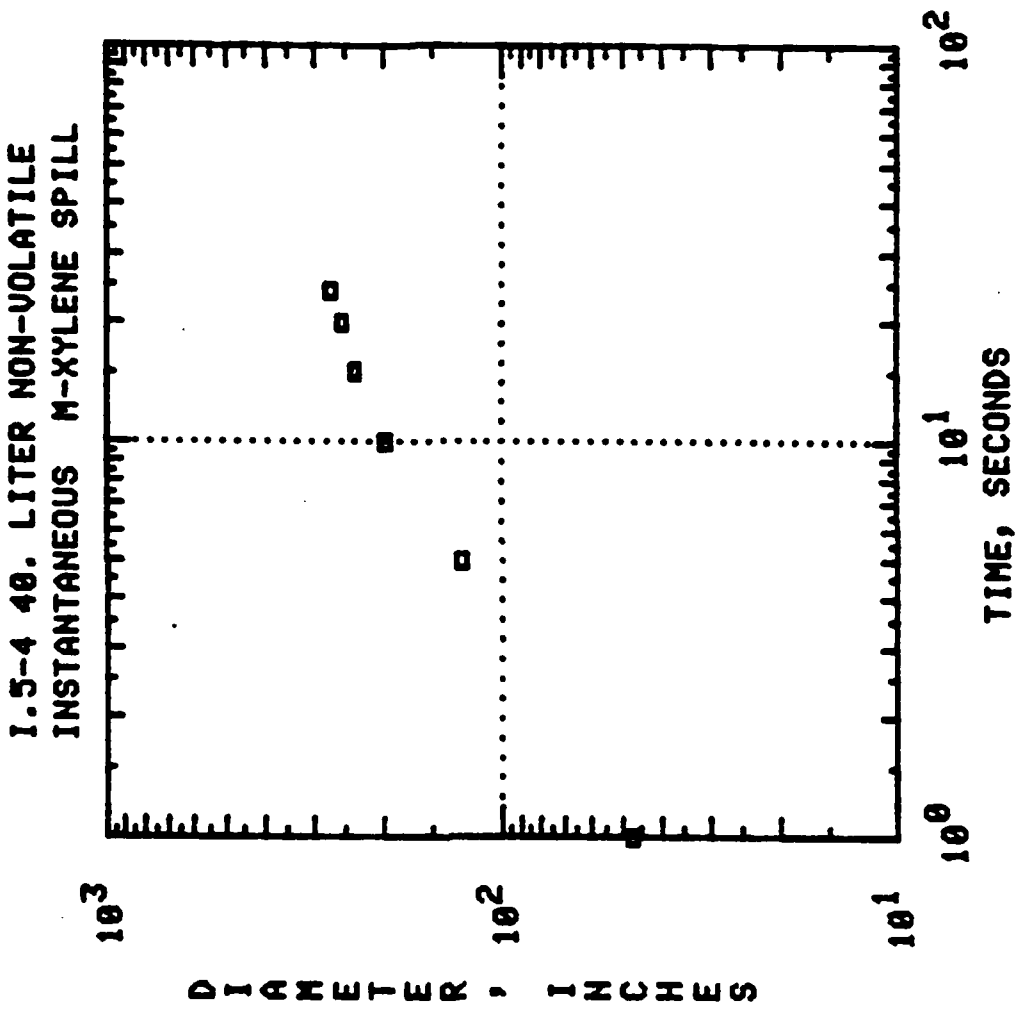

I.4-4 40. LITER NON-VOLATILE
INSTANTANEOUS NAPHTHA SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


1.4-5 60. LITER NON-VOLATILE
INSTANTANEOUS NAPHTHA SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


1.5-1 5. LITER NON-VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1


1.5-2 10. LITER NON-VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


1.5-3 20. LITER NON-VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

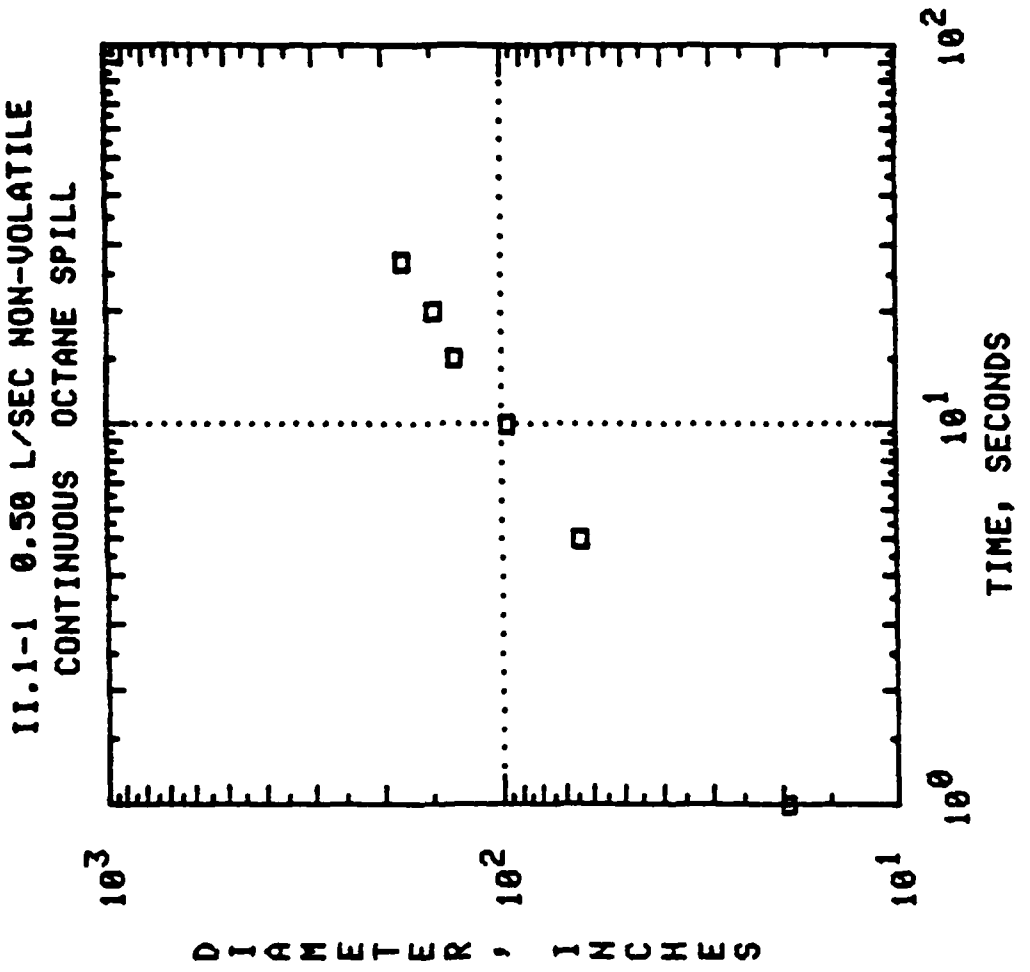

1.5-4 40. LITER NON-VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

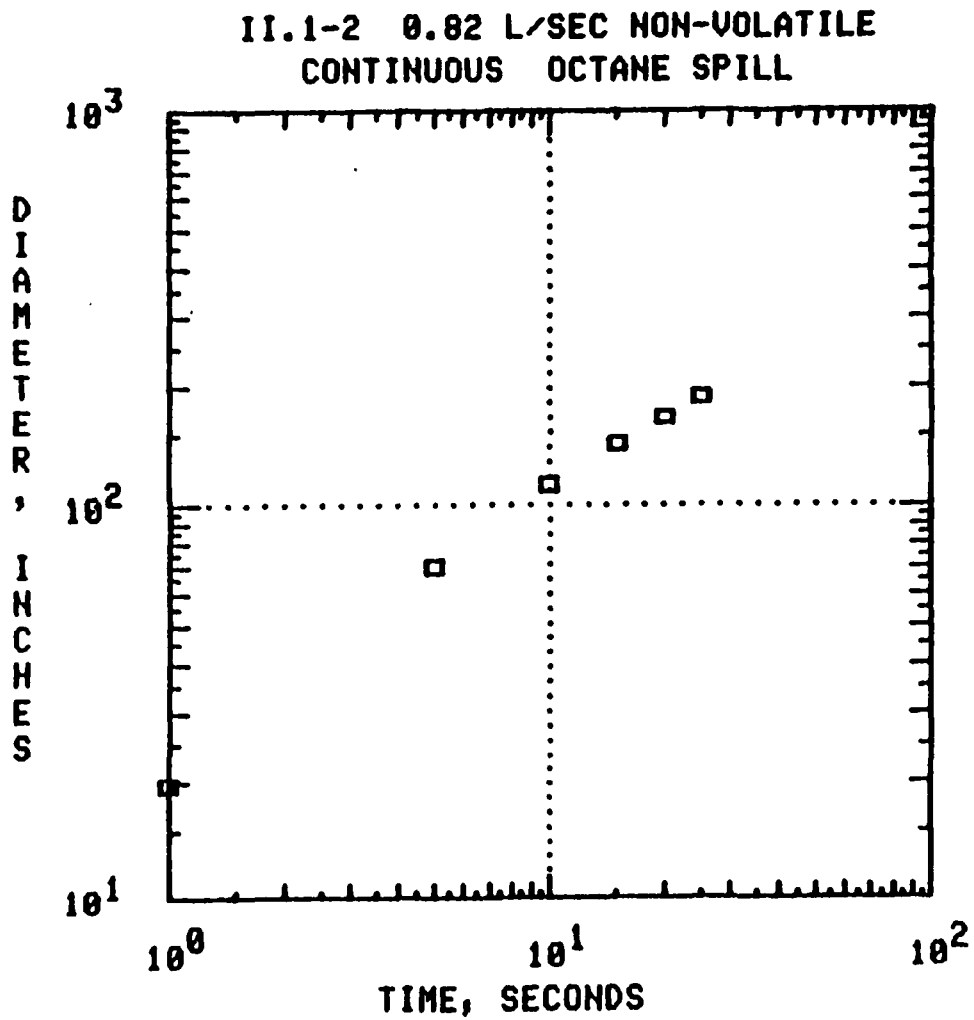
APPENDIX B

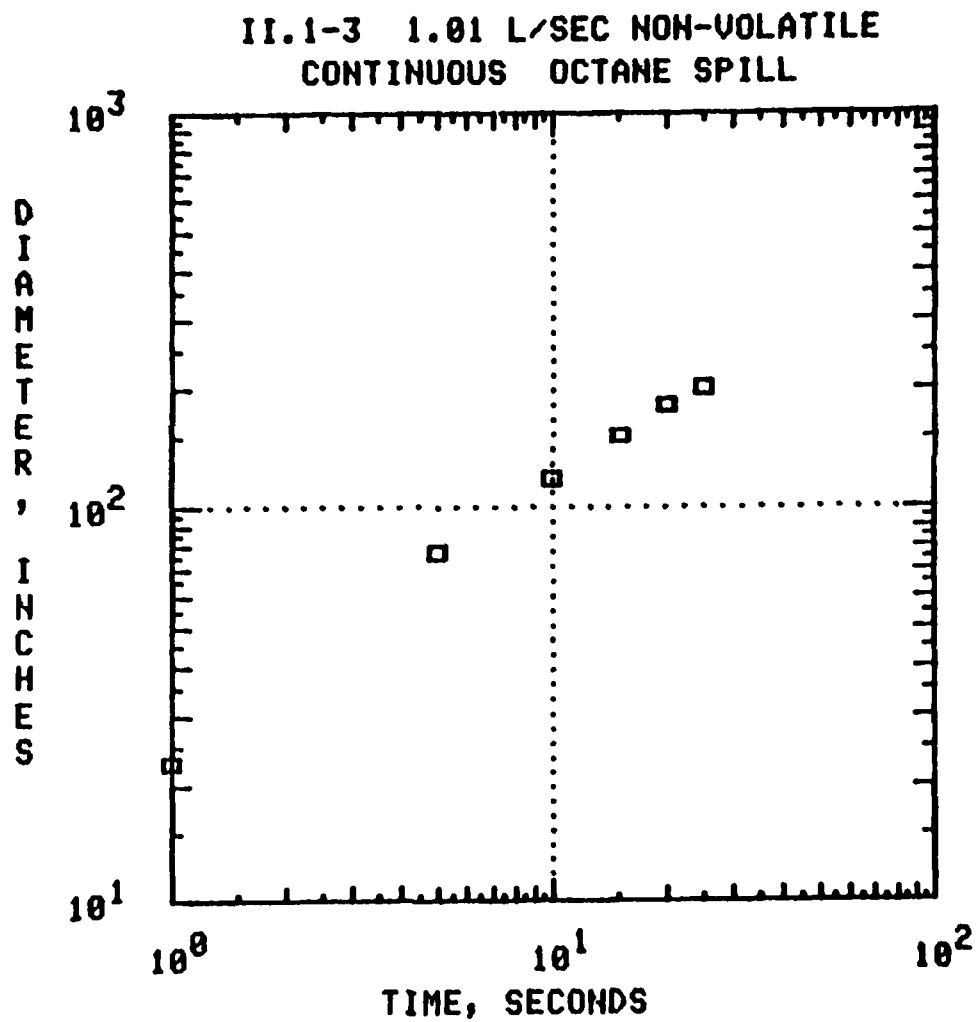
SPREADING TEST SERIES II - *NON-VOLATILE CONTINUOUS SPILLS IN BASIN*

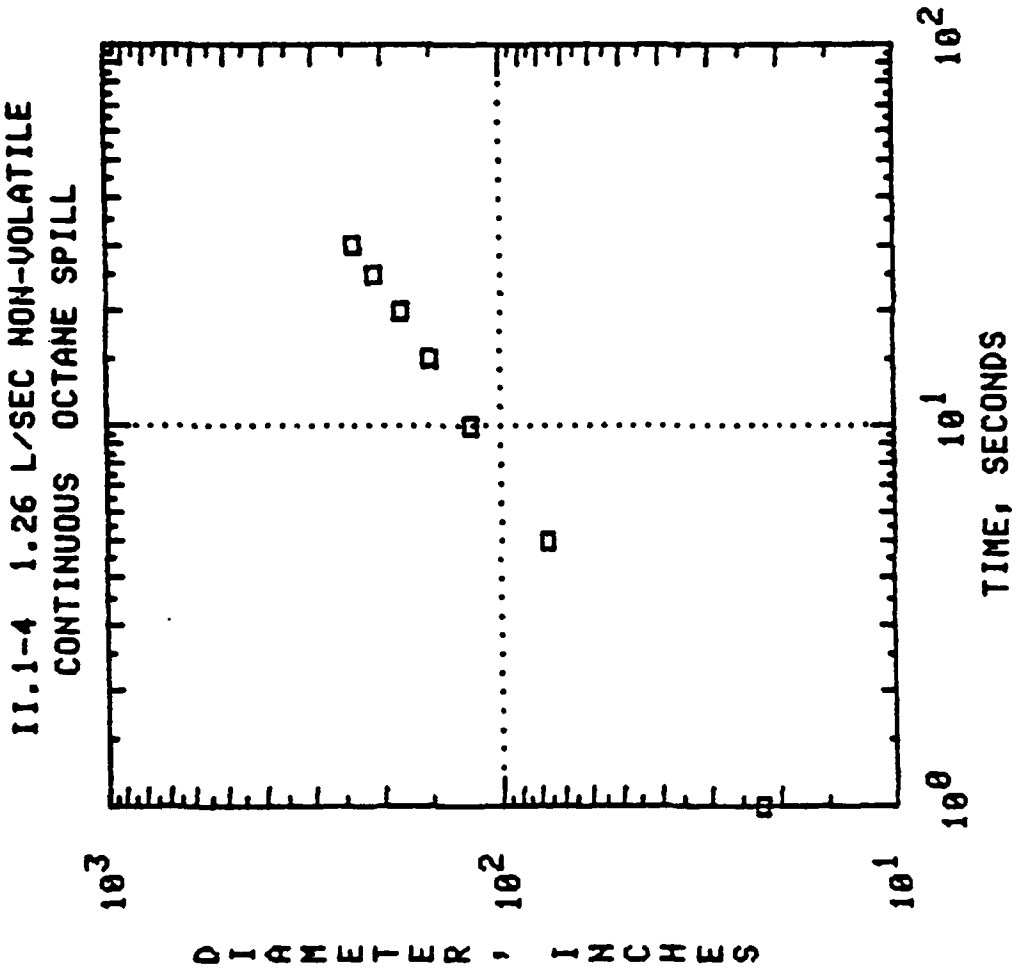
SUMMARY OF TEST CONDITIONS FOR
SPREADING TEST SERIES II -
NON-VOLATILE CONTINUOUS SPILLS IN BASIN

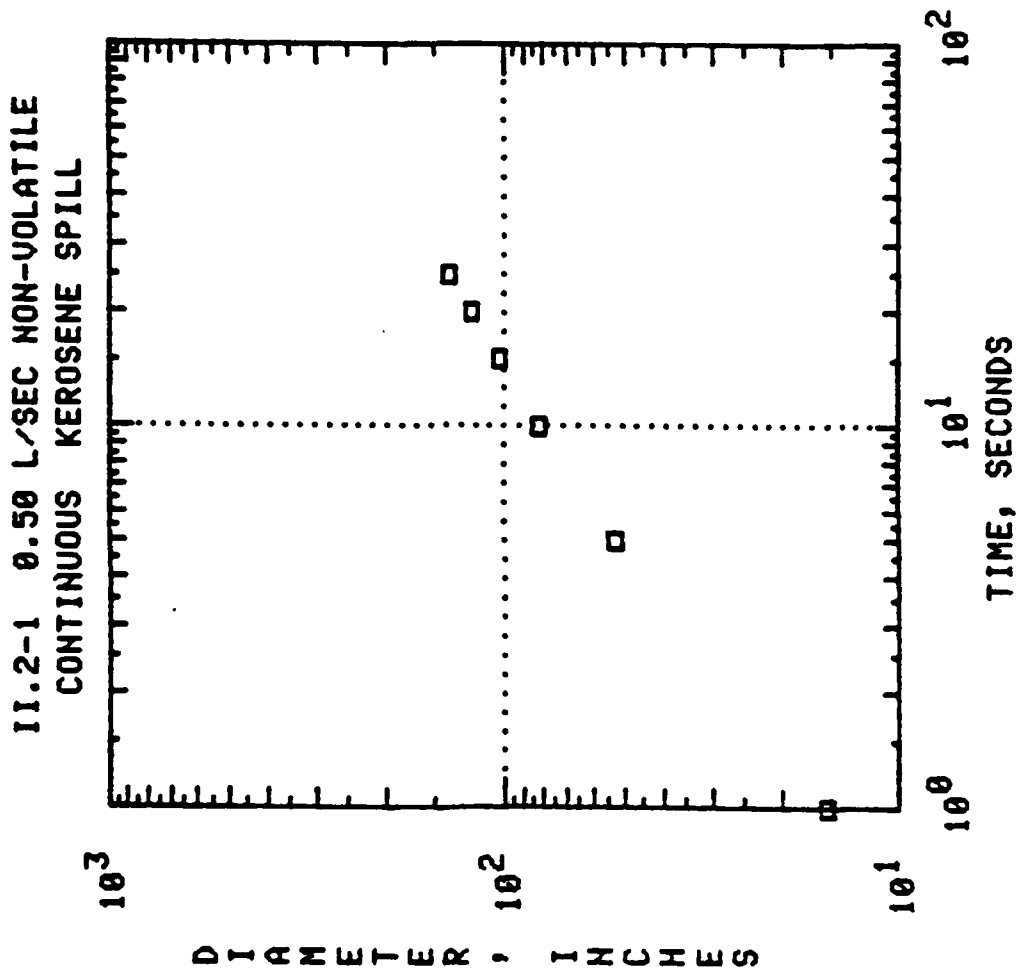
Run Number	Chemical	Specific Gravity	σ_{sp} Coef.	Spill Diameter (cm)	Spill Rate (liters/sec)
II.1-1	Octane	0.703	0.3	7.6	0.50
II.1-2					0.82
II.1-3					1.01
II.1-4					1.26
II.2-1	Kerosene	0.795	-2.7	7.6	0.50
II.2-2					0.82
II.2-3					1.01
II.2-4					1.26
II.3-1	n-Hexanol	0.819	39.75	7.6	0.50
II.3-2					0.82
II.3-3					1.01
II.3-4					1.26
II.4-1	Naphtha	0.860	7.8	7.6	0.50
II.4-2					0.63
II.4-3					0.95
II.4-4					1.10
II.4-5					1.26
II.5-1	m-Xylene	0.864	7.0	7.6	0.50
II.5-2					0.82
II.5-3					1.01
II.5-4					1.26

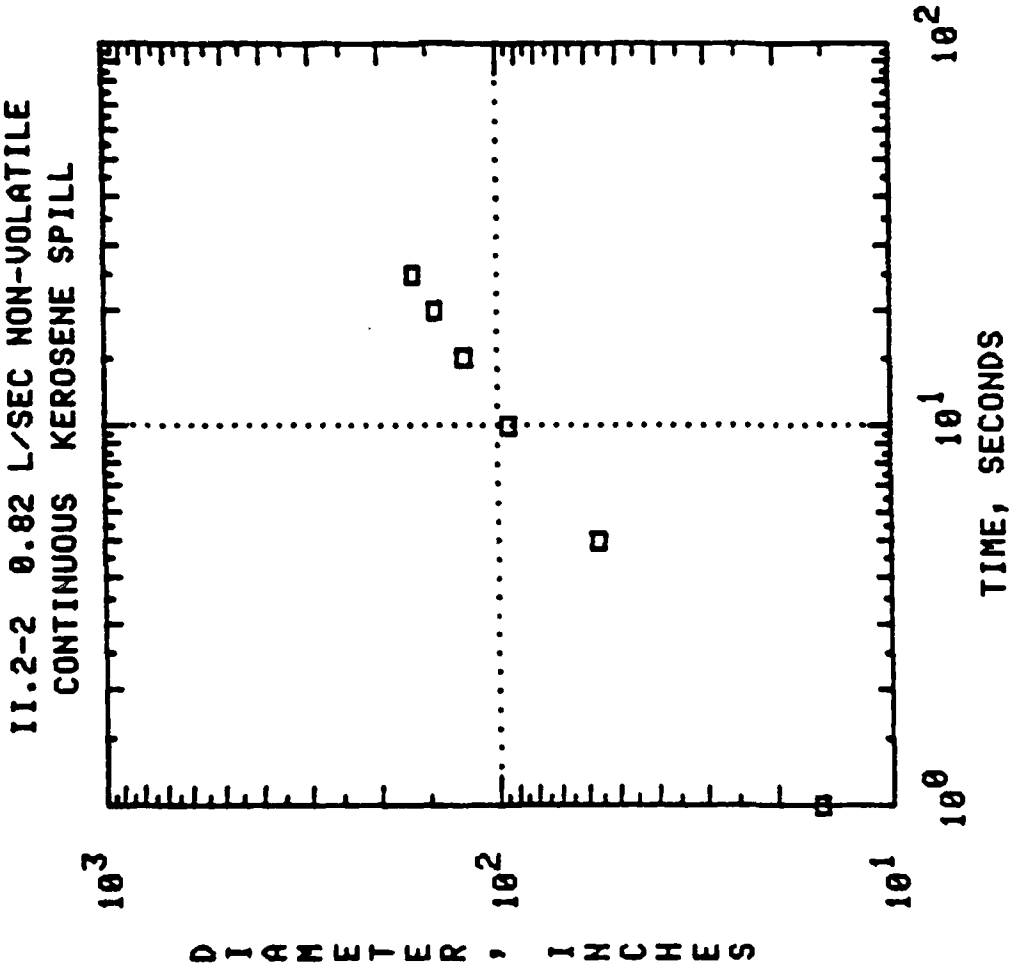

II.1-1 0.50 L/SEC NON-VOLATILE
CONTINUOUS OCTANE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

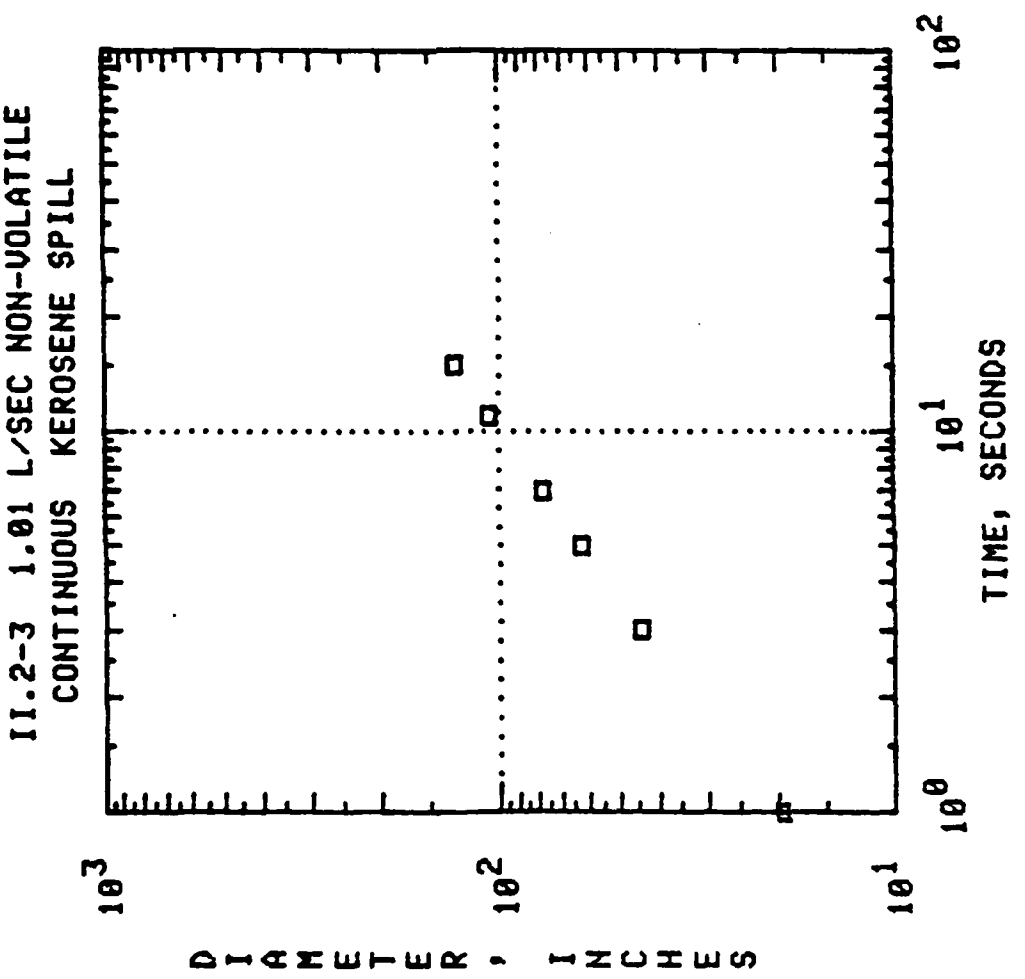

II.1-2 0.82 L/SEC NON-VOLATILE
CONTINUOUS OCTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

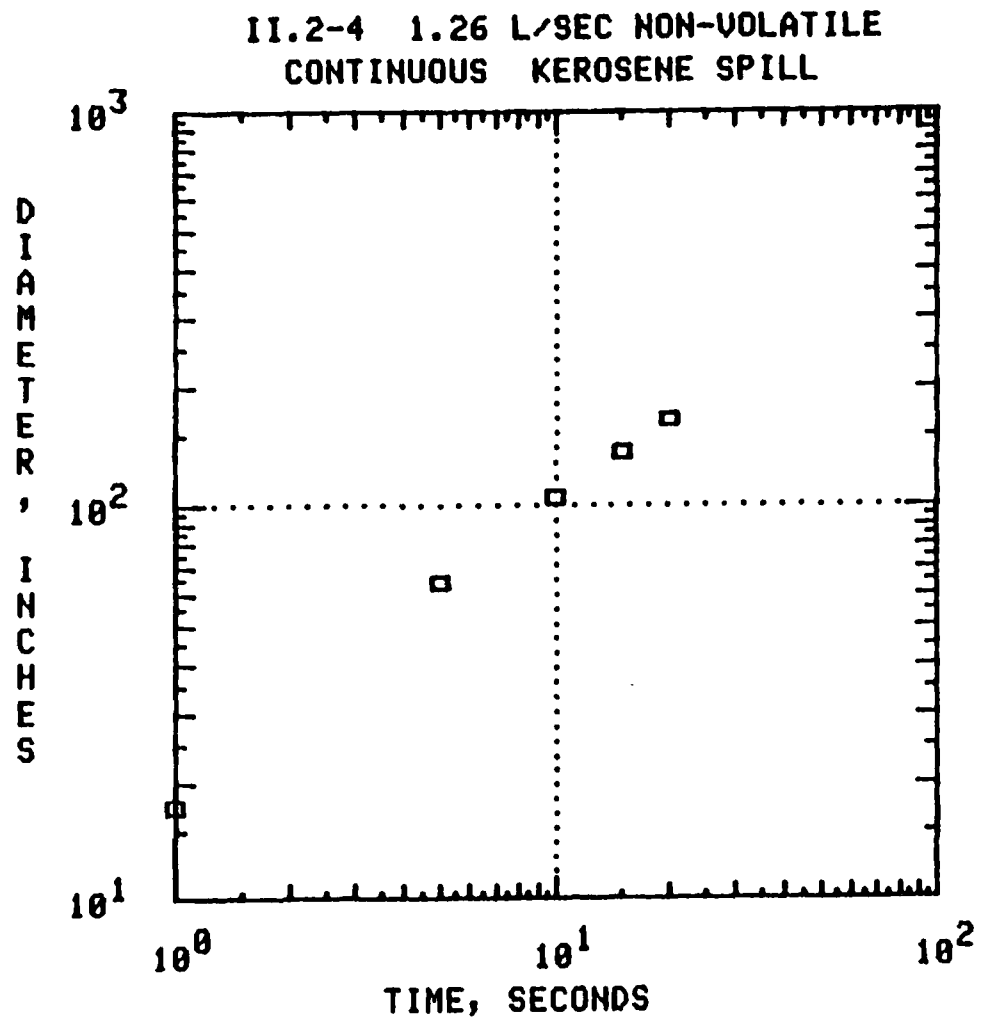

II.1-3 1.01 L/SEC NON-VOLATILE
CONTINUOUS OCTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

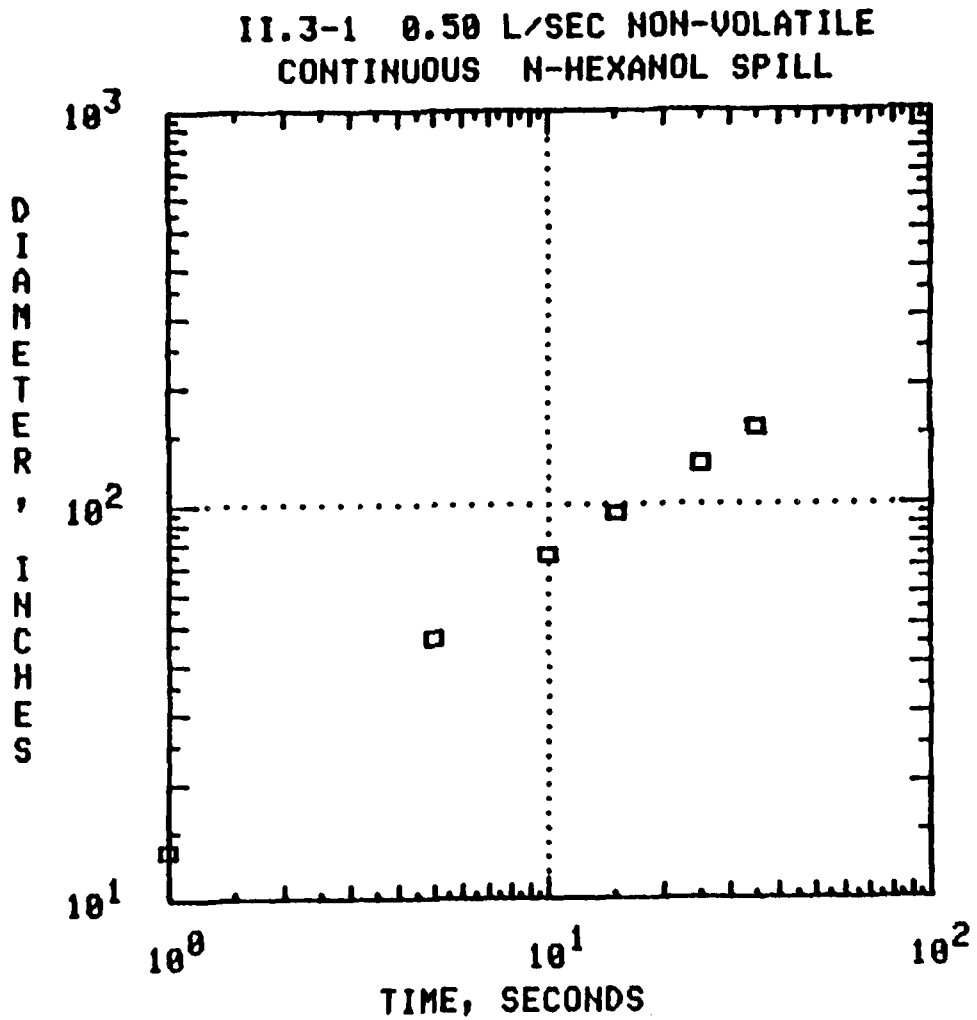

II.1-4 1.26 L/SEC NON-VOLATILE
CONTINUOUS OCTANE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

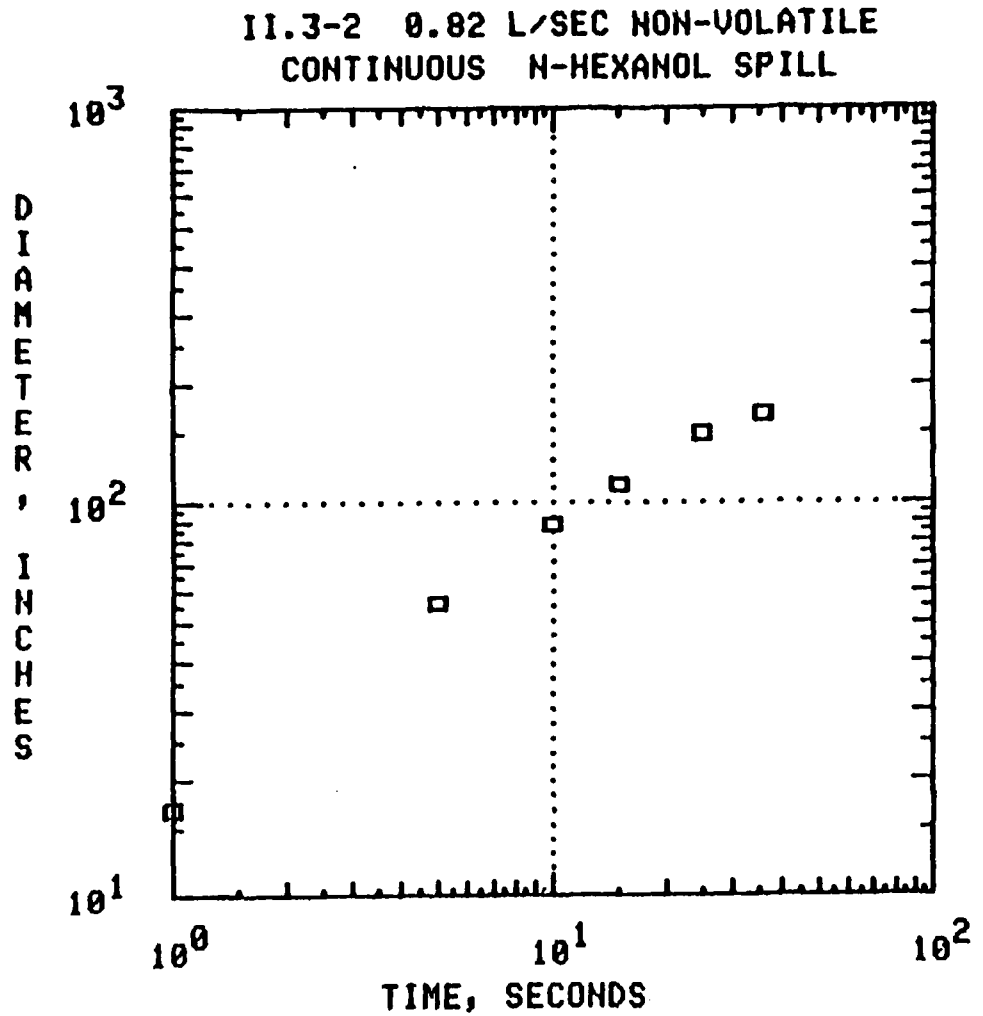

II.2-1 0.50 L/SEC NON-VOLATILE
CONTINUOUS KEROSENE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

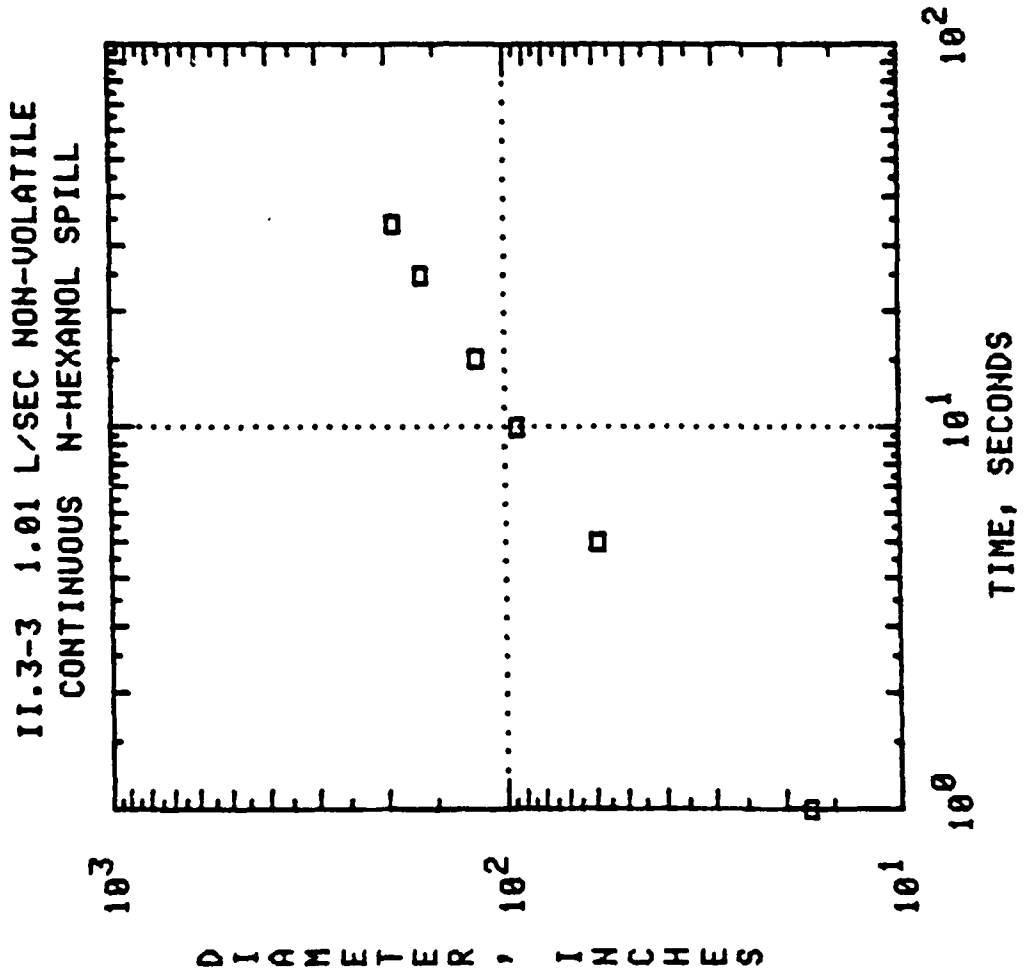

II.2-2 0.82 L/SEC NON-VOLATILE
CONTINUOUS KEROSENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

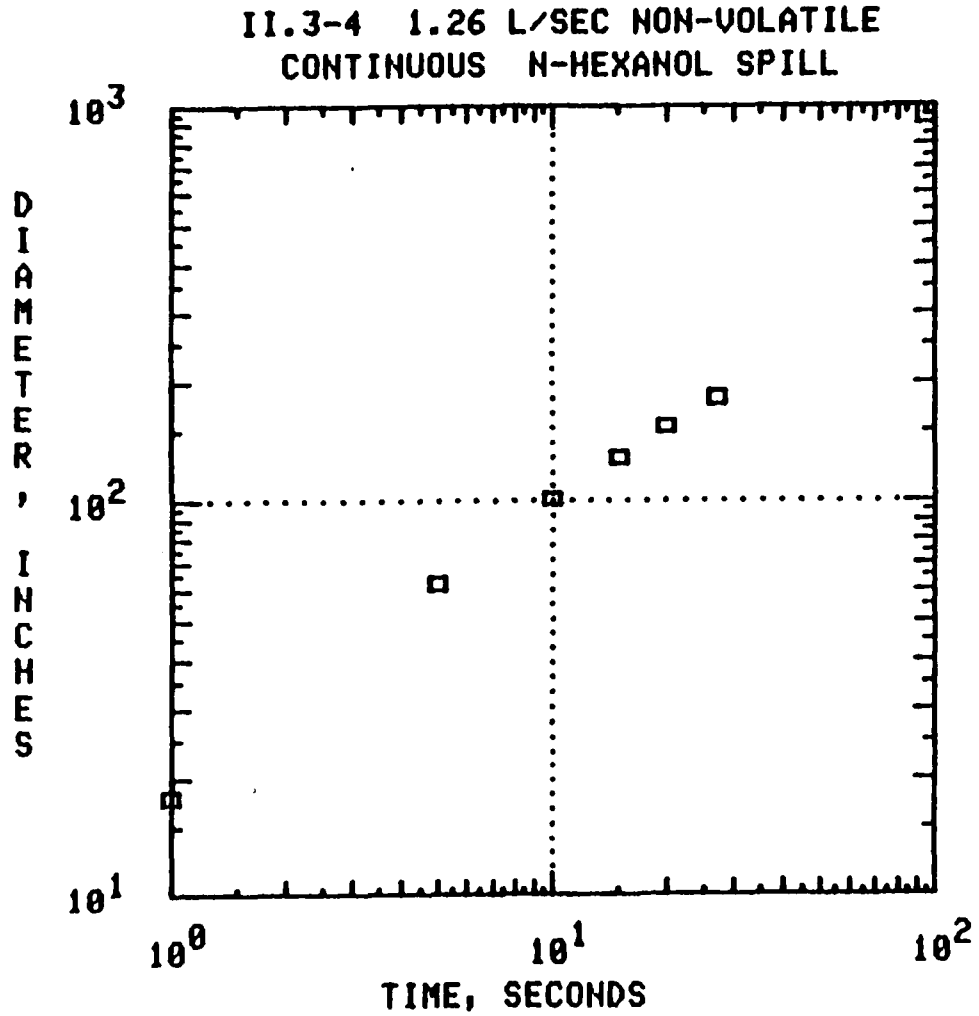

II.2-3 1.01 L/SEC NON-VOLATILE
CONTINUOUS KEROSENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

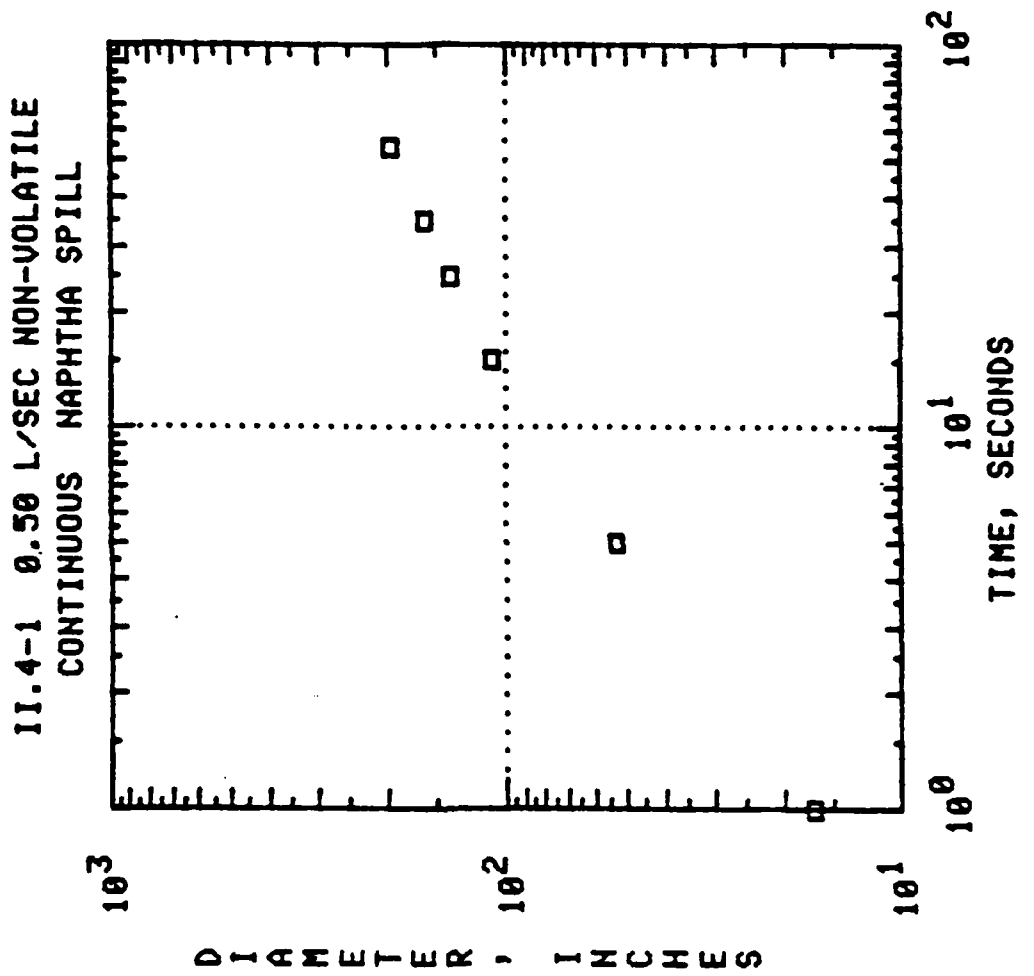

II.2-4 1.26 L/SEC NON-VOLATILE
CONTINUOUS KEROSENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

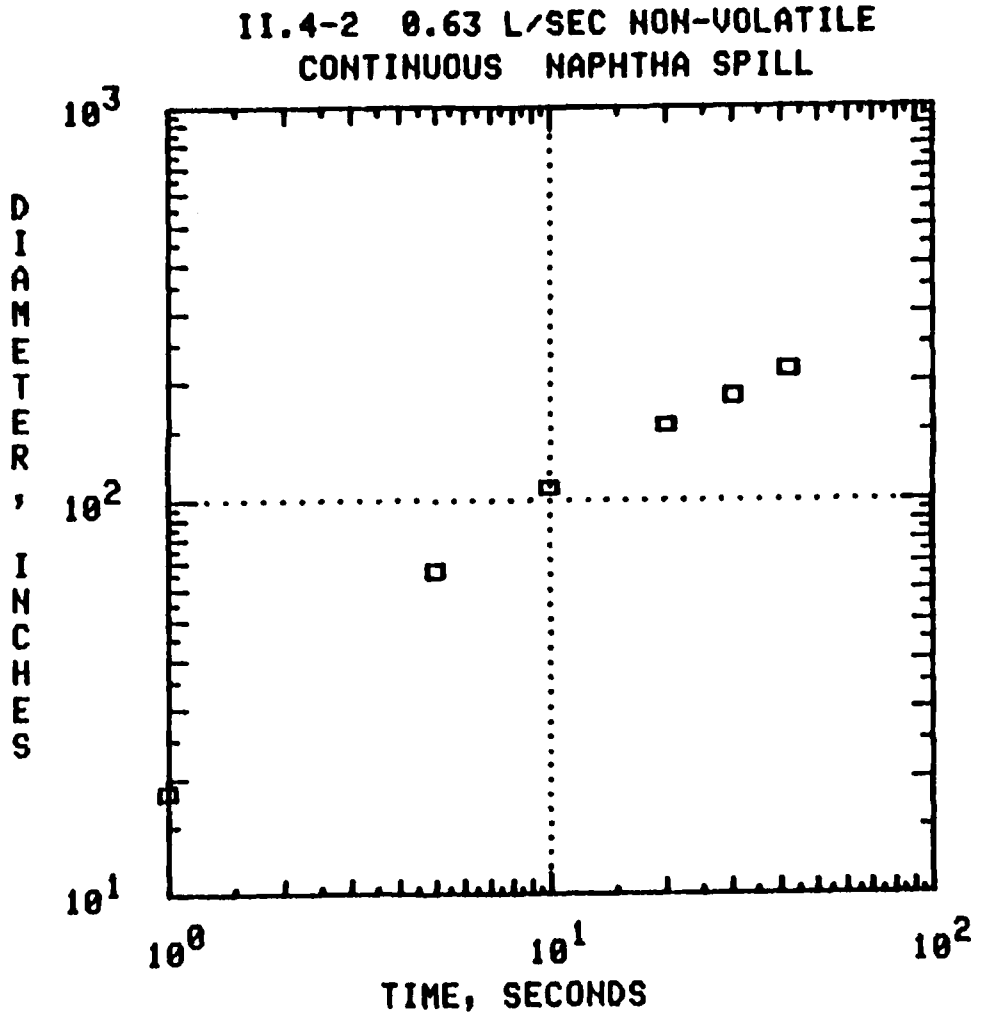

II.3-1 0.50 L/SEC NON-VOLATILE
CONTINUOUS N-HEXANOL SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

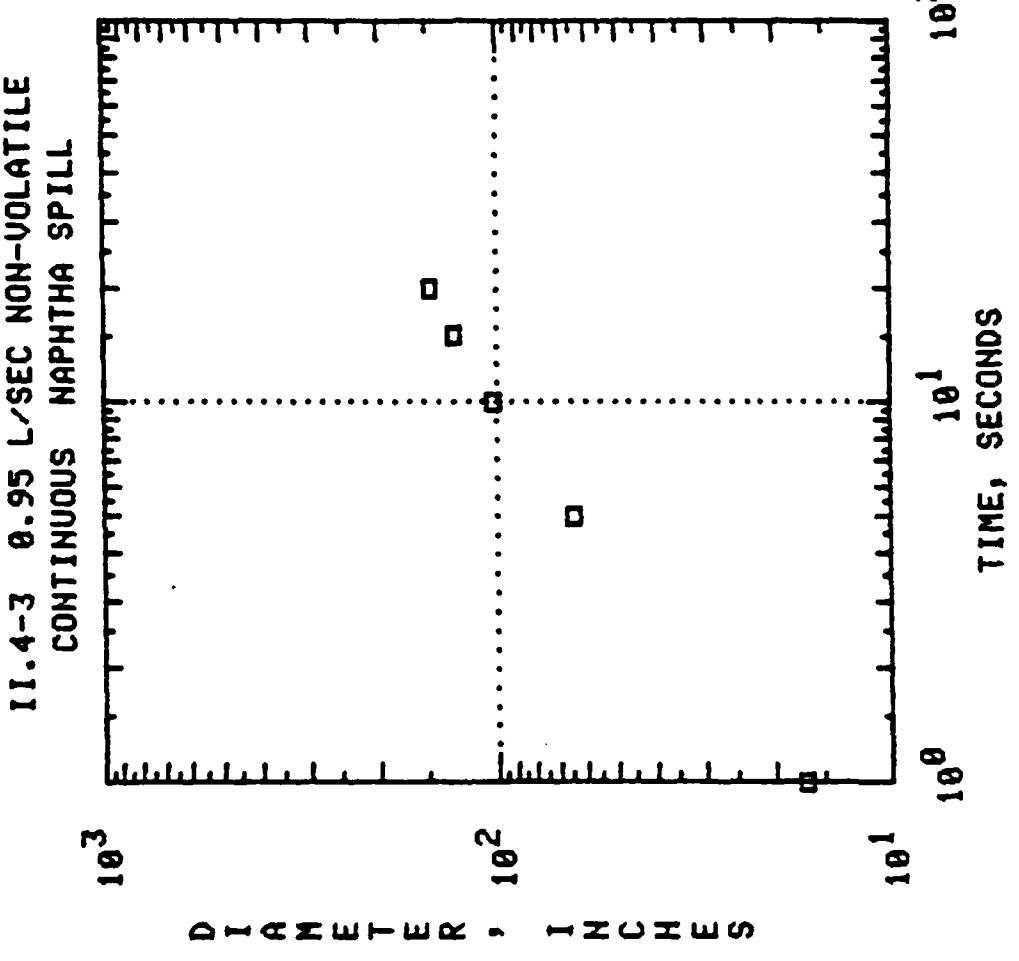

II.3-2 0.82 L/SEC NON-VOLATILE
CONTINUOUS N-HEXANOL SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

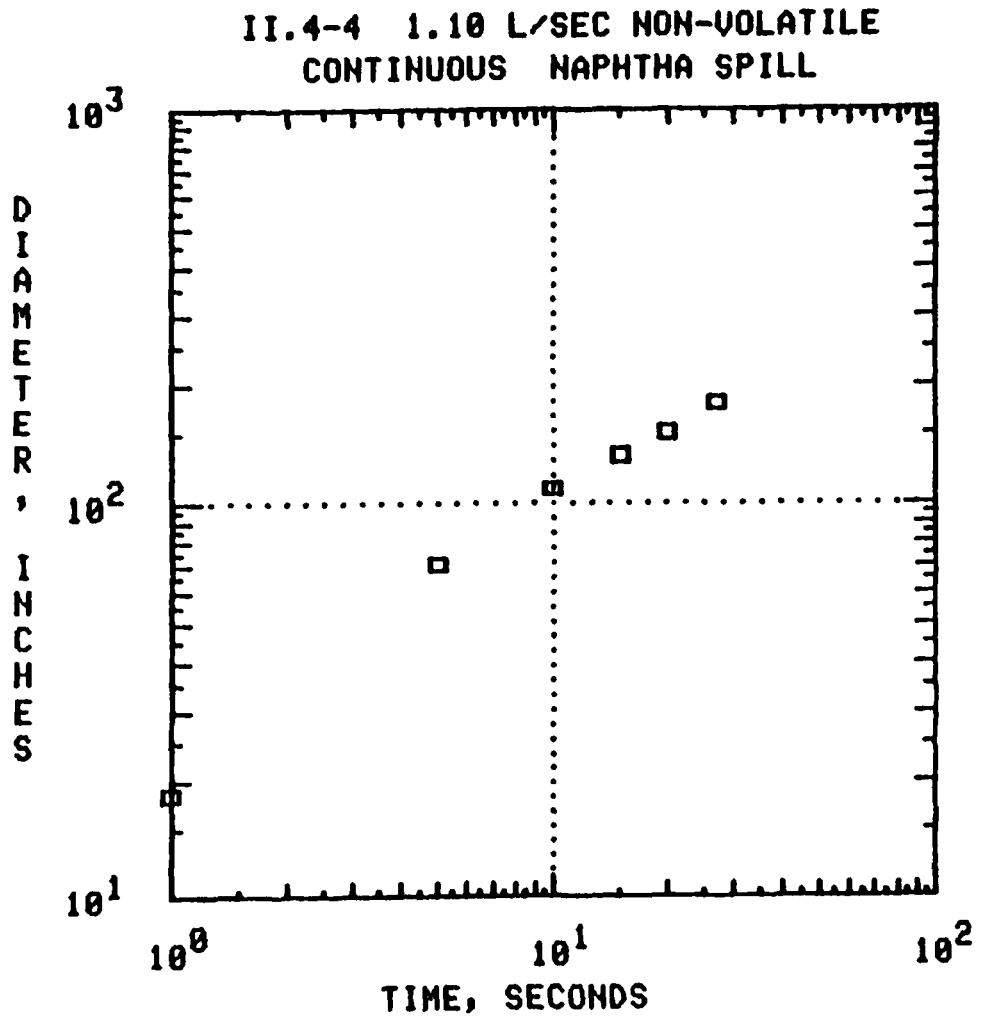

II.3-3 1.01 L/SEC NON-VOLATILE
CONTINUOUS N-HEXANOL SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

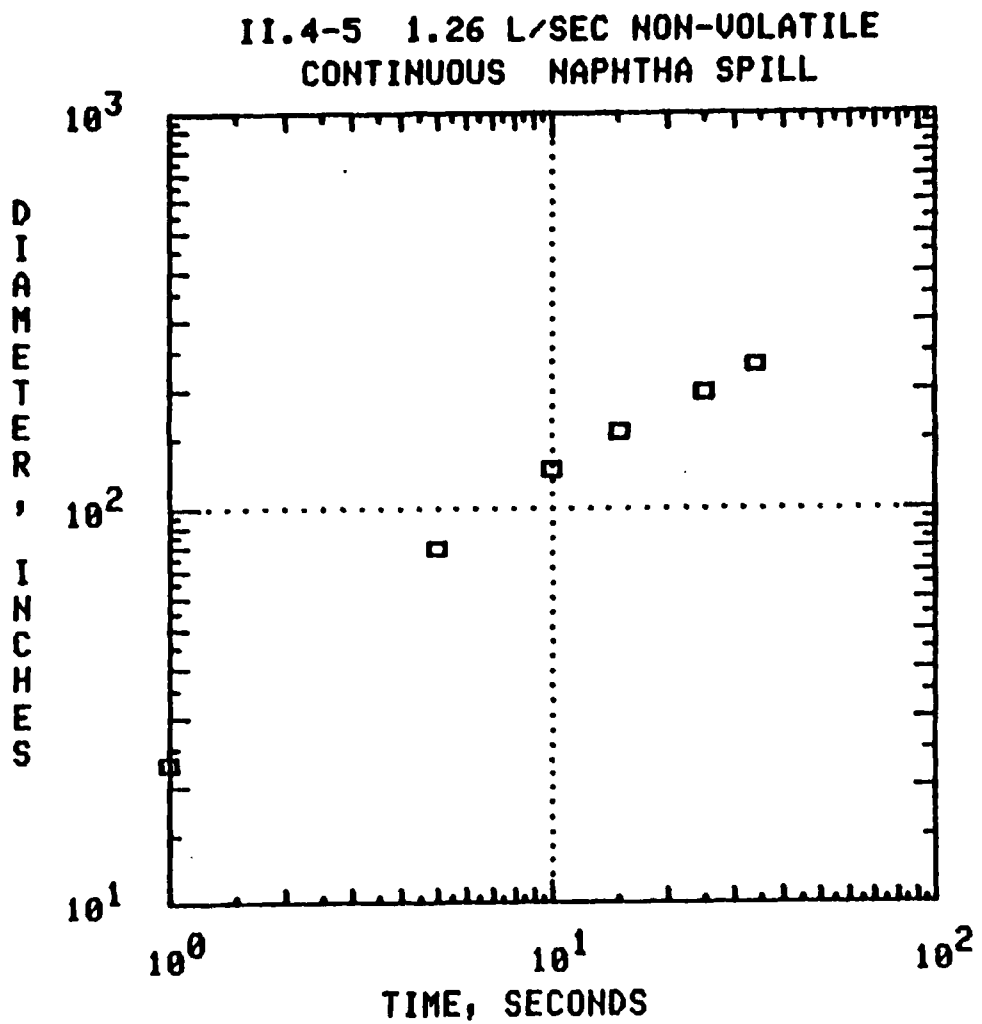

II.3-4 1.26 L/SEC NON-VOLATILE
CONTINUOUS N-HEXANOL SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

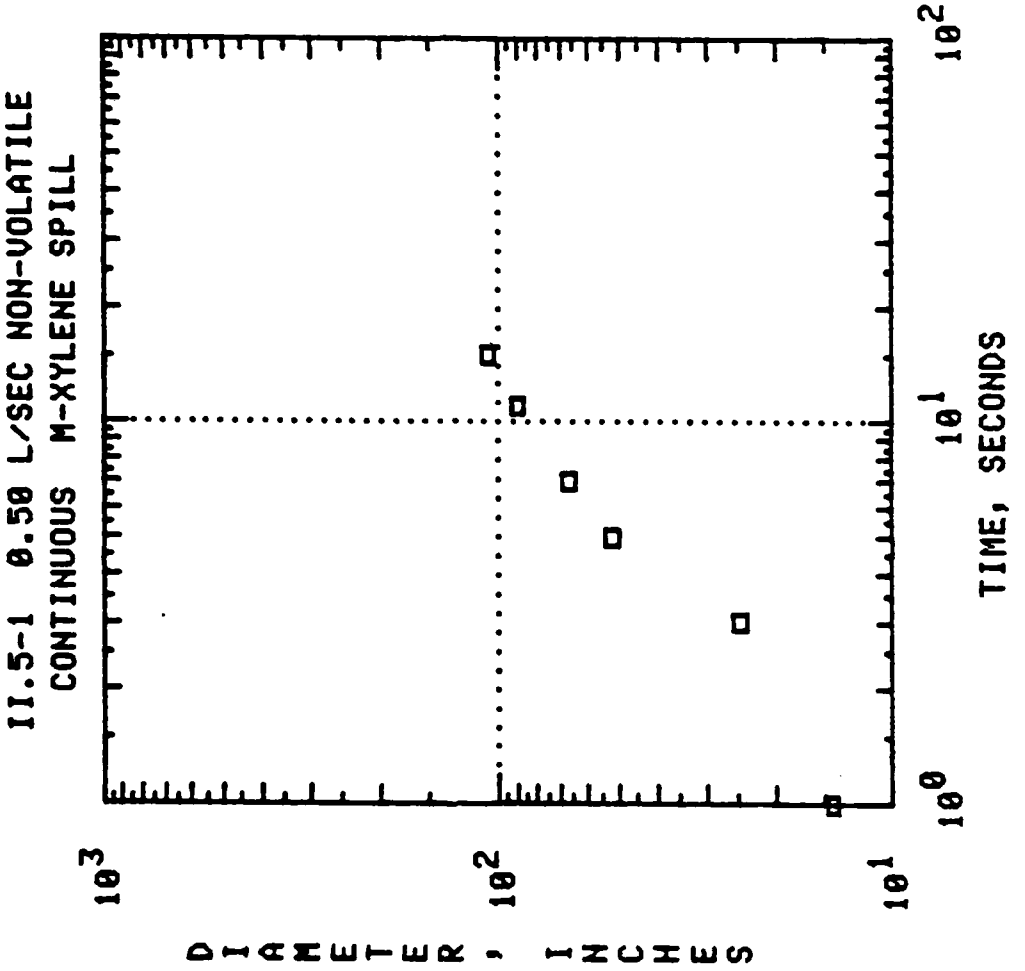

II.4-1 0.50 L/SEC NON-VOLATILE
CONTINUOUS NAPHTHA SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

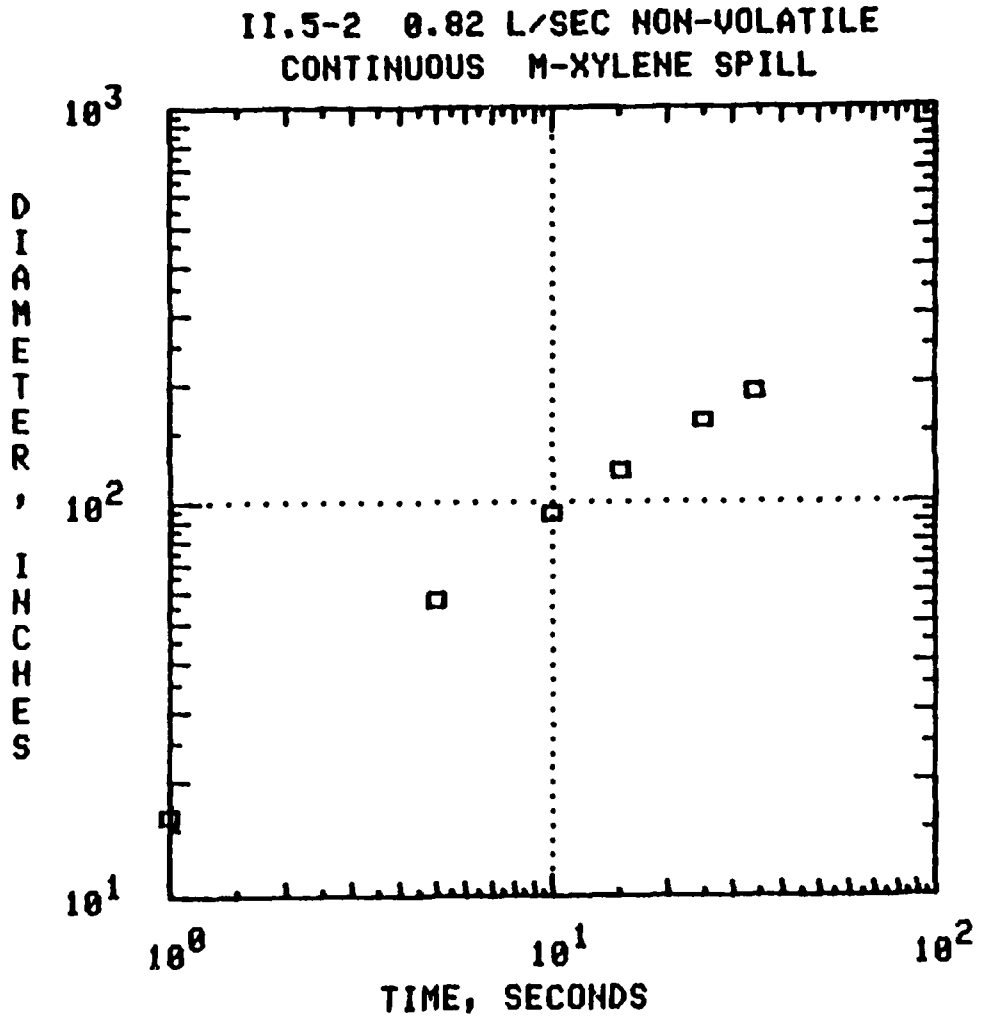

II.4-2 0.63 L/SEC NON-VOLATILE
CONTINUOUS NAPHTHA SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

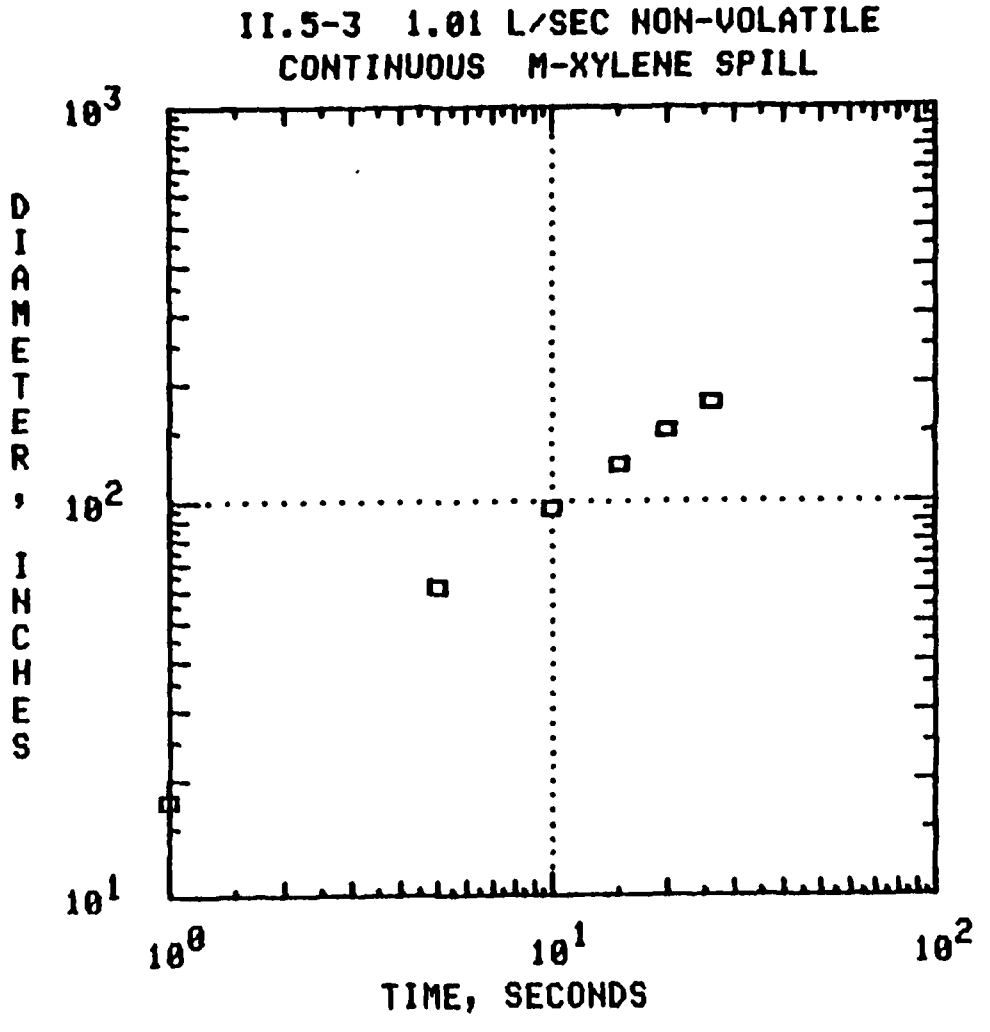

II.4-3 0.95 L/SEC NON-VOLATILE
CONTINUOUS NAPHTHA SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

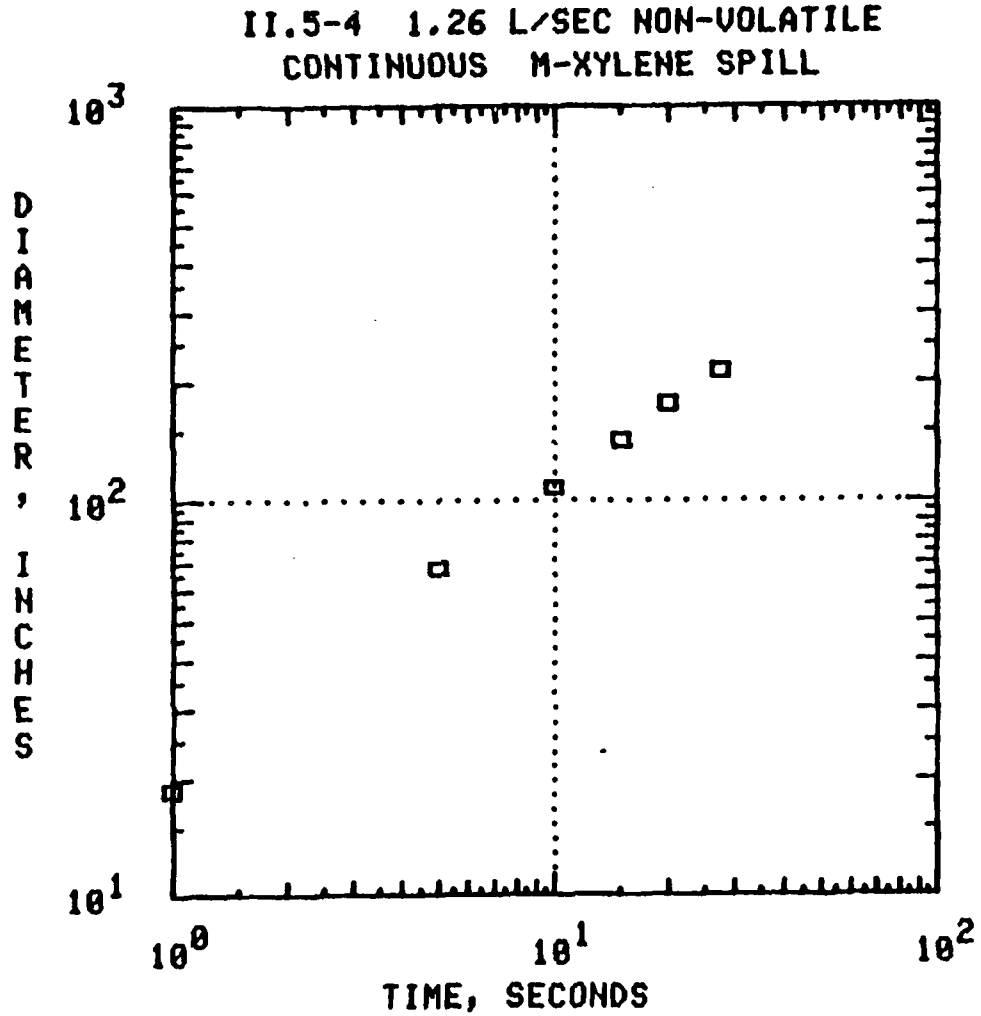

II.4-4 1.10 L/SEC NON-VOLATILE
CONTINUOUS NAPHTHA SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS


II.4-5 1.26 L/SEC NON-VOLATILE
CONTINUOUS NAPHTHA SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS


II.5-1 0.50 L/SEC NON-VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


II.5-2 0.82 L/SEC NON-VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS


II.5-3 1.01 L/SEC NON-VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

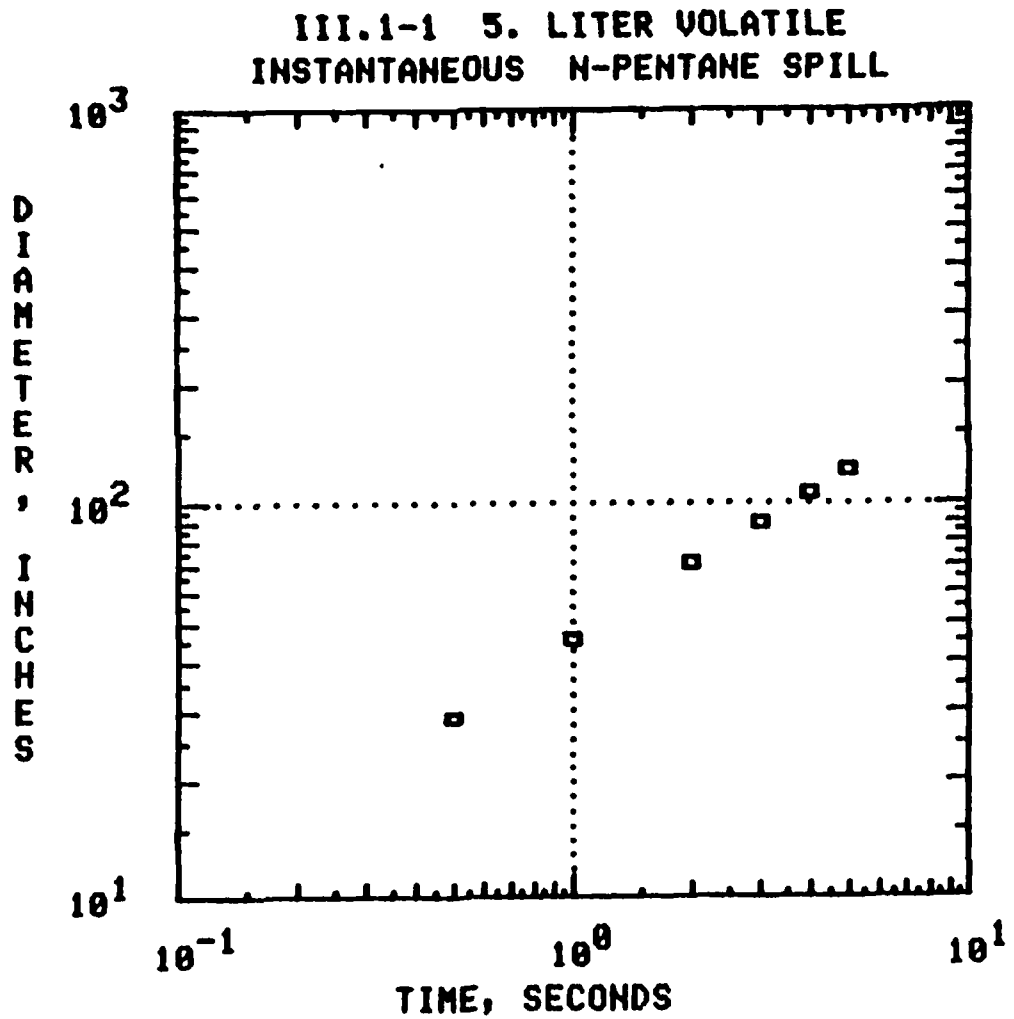

II.5-4 1.26 L/SEC NON-VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

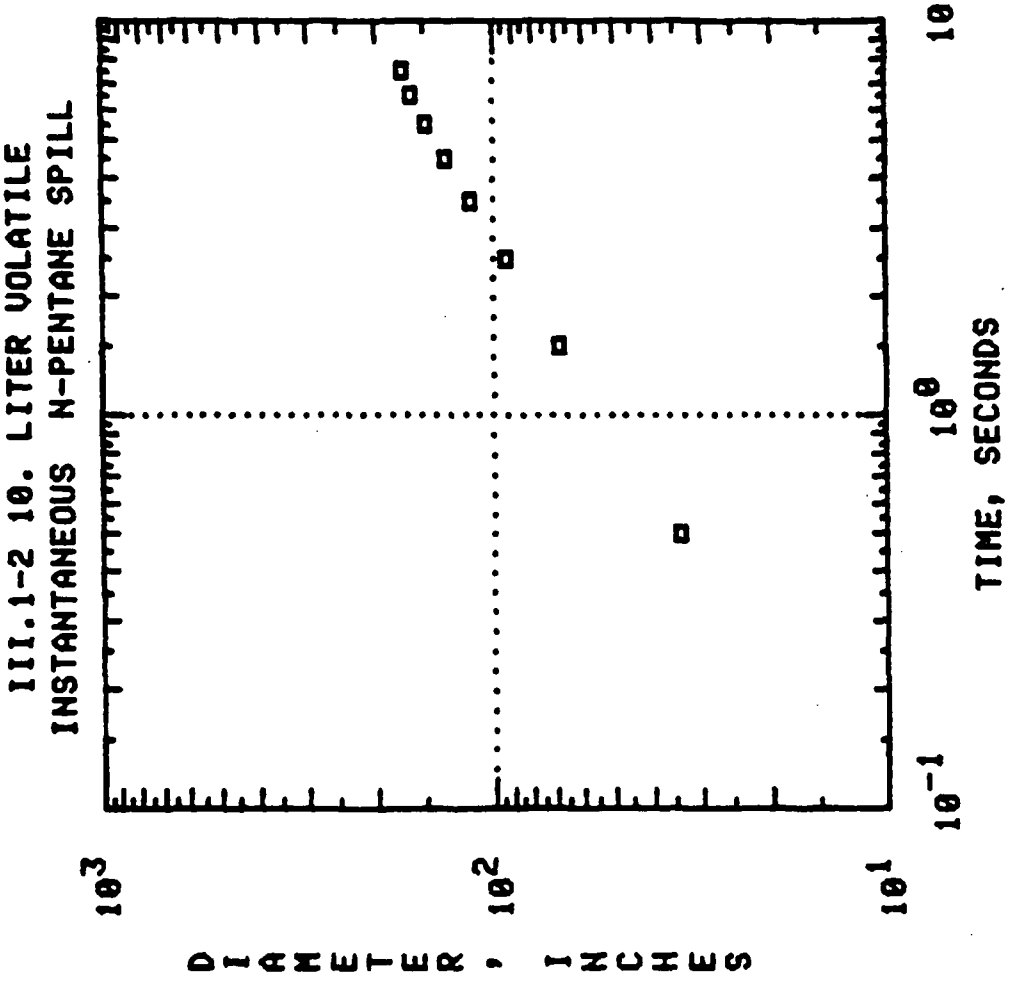
APPENDIX C

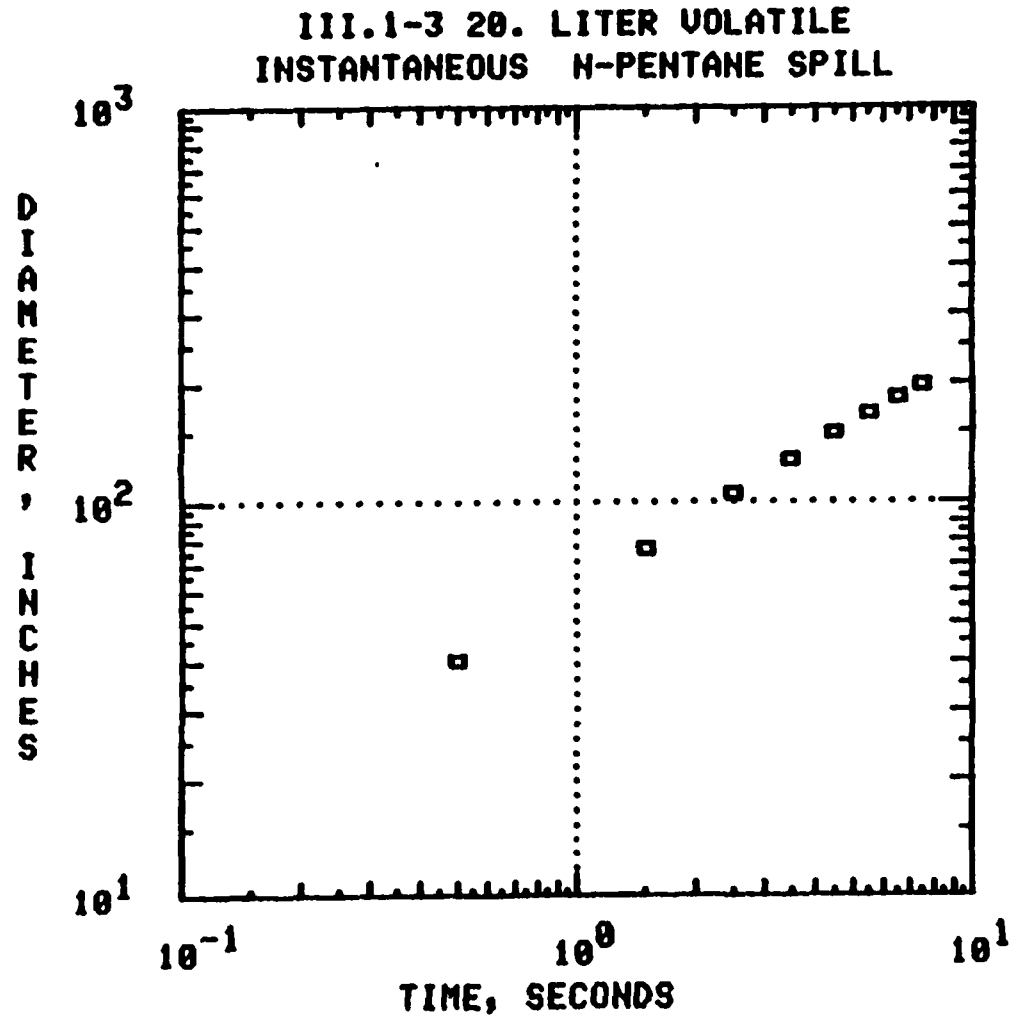
SPREADING TEST SERIES III - VOLATILE INSTANTANEOUS SPILLS IN BASIN

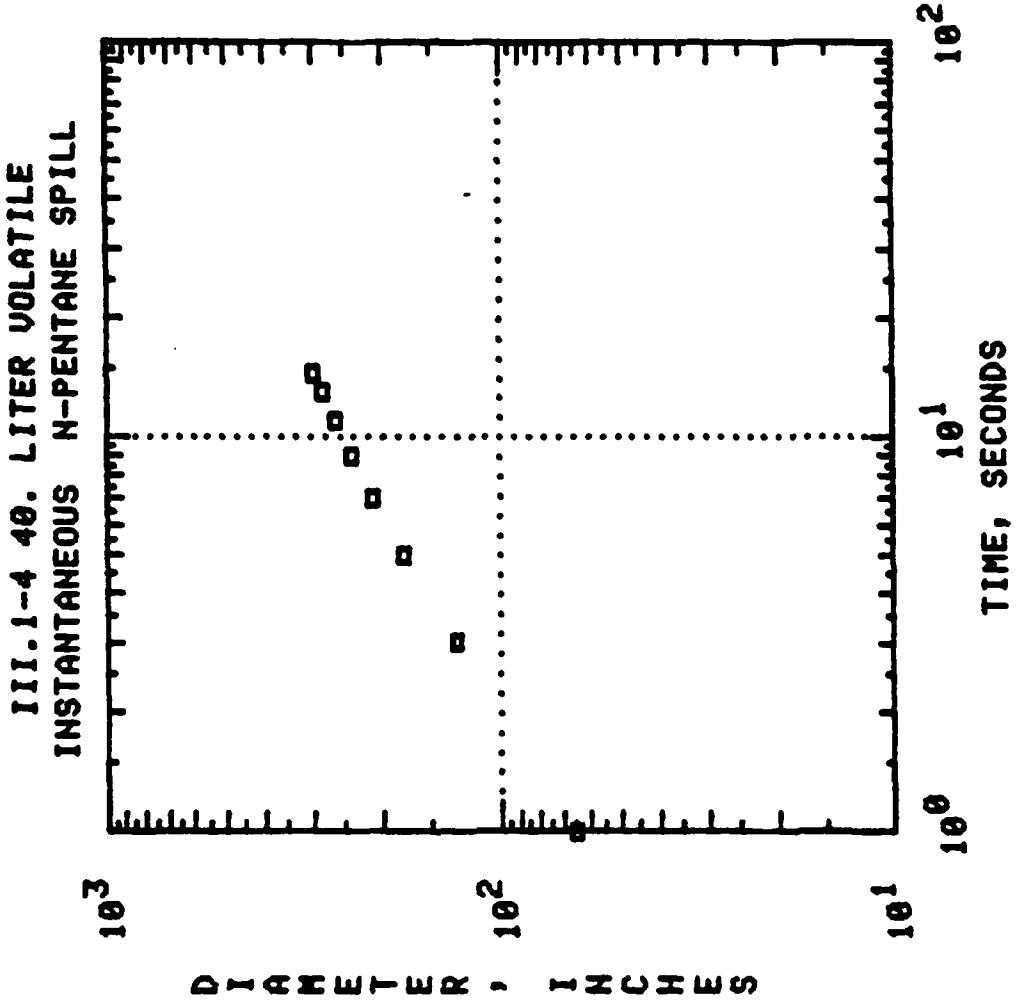
SUMMARY OF TEST CONDITIONS FOR
SPREADING TEST SERIES III -
VOLATILE INSTANTANEOUS SPILLS IN BASIN

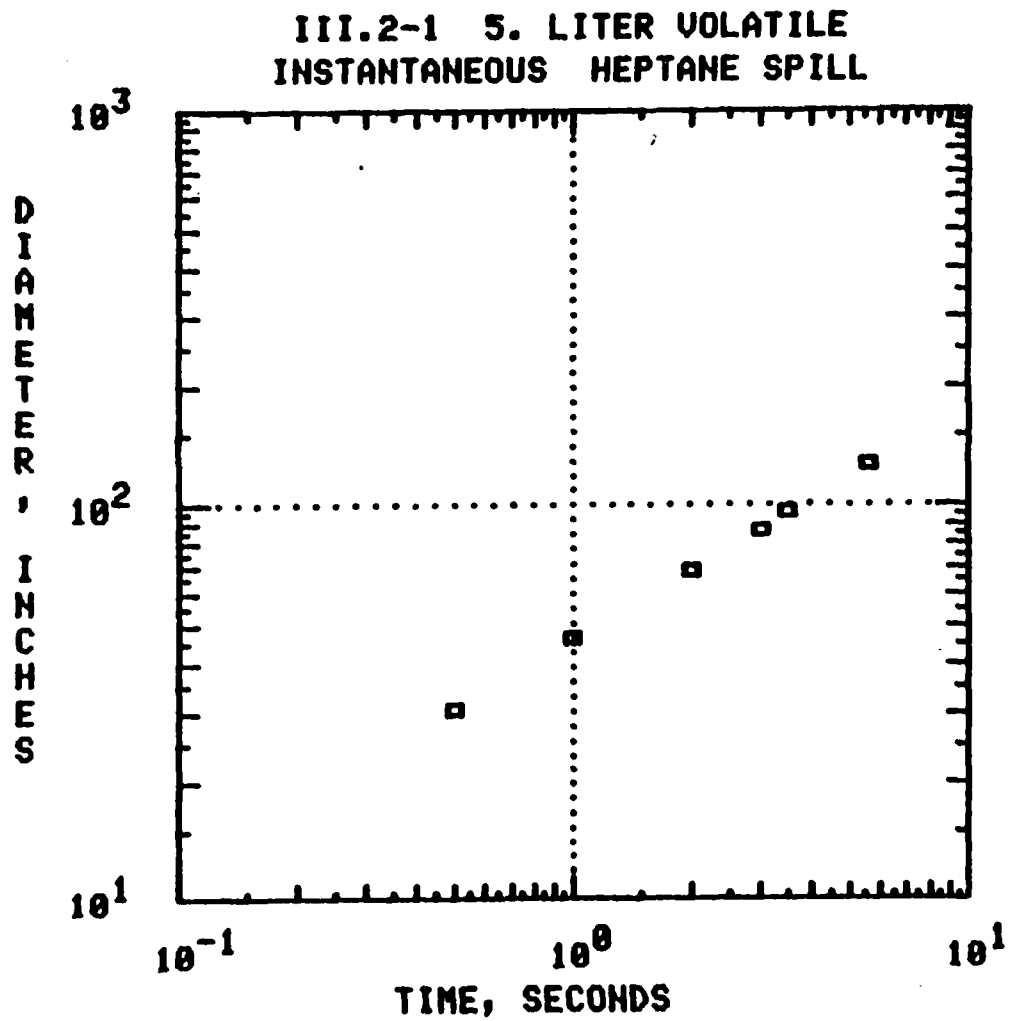
Run Number	Chemical	Specific Gravity	σ_{sp} Coef.	Spill Diameter (cm)	Spill Volume (liters)	Wind Speed (m/s)
III.1-1	n-Pentane	0.626	6.5	20.3	5	1.67
III.1-2				30.5	10	0.68
III.1-3				40.6	20	0.81
III.1-4				61.0	40	1.83
III.2-1	Heptane	0.684	1.6	20.3	5	2.44
III.2-2				30.5	10	1.30
III.2-3				40.6	20	1.20
III.2-4				61.0	40	1.69
III.3-1	Octane	0.703	0.3	20.3	5	0.56
III.3-2				30.5	10	0.80
III.3-3				40.6	20	1.46
III.3-4				61.0	40	1.30
III.4-1	m-Xylene	0.864	7.0	20.3	5	1.72
III.4-2				30.5	10	1.39
III.4-3				40.6	20	2.87
III.4-4				61.0	40	1.40
III.5-1	Ethyl Acetate	0.901	45.89	20.3	5	1.01
III.5-2				30.5	10	0.81
III.5-3				40.6	20	2.12
III.5-4				61.0	40	1.83

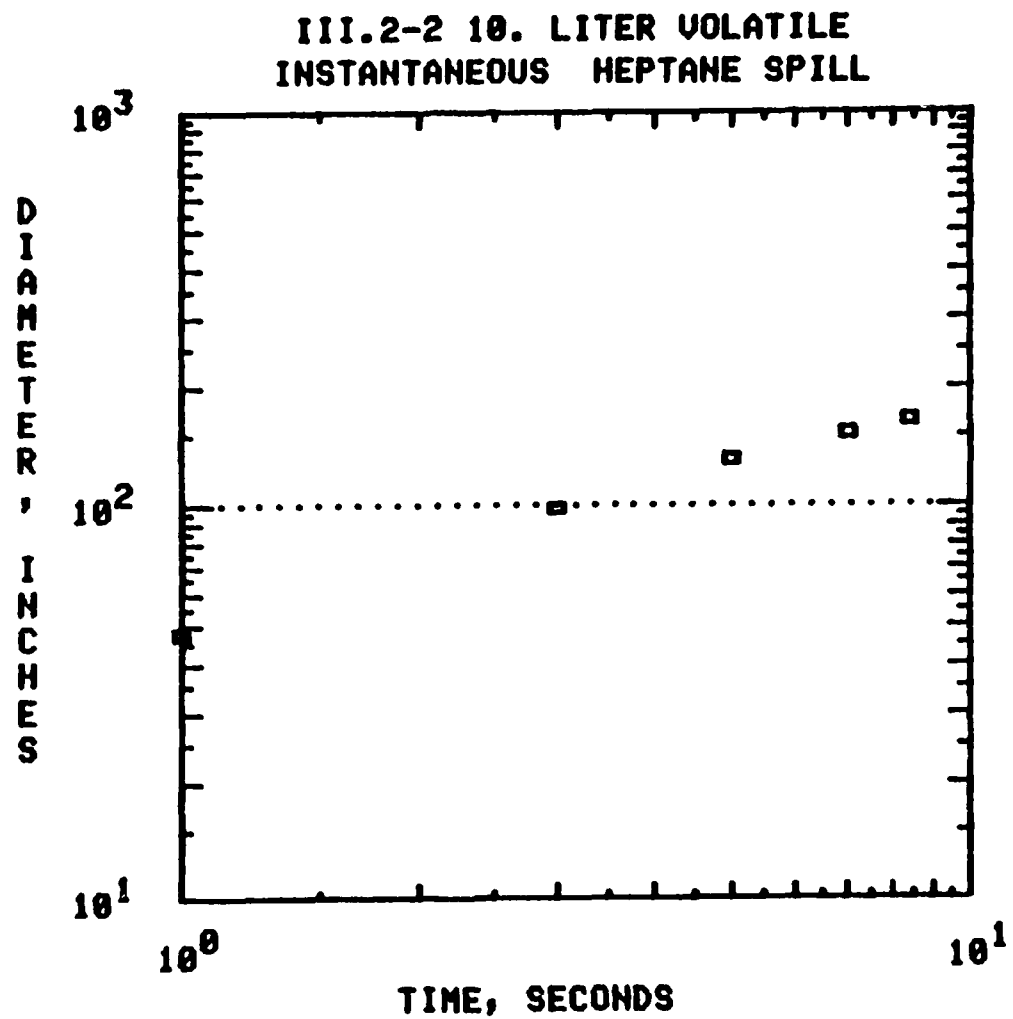

III.1-1 5. LITER VOLATILE
INSTANTANEOUS N-PENTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
TIME, SECONDS

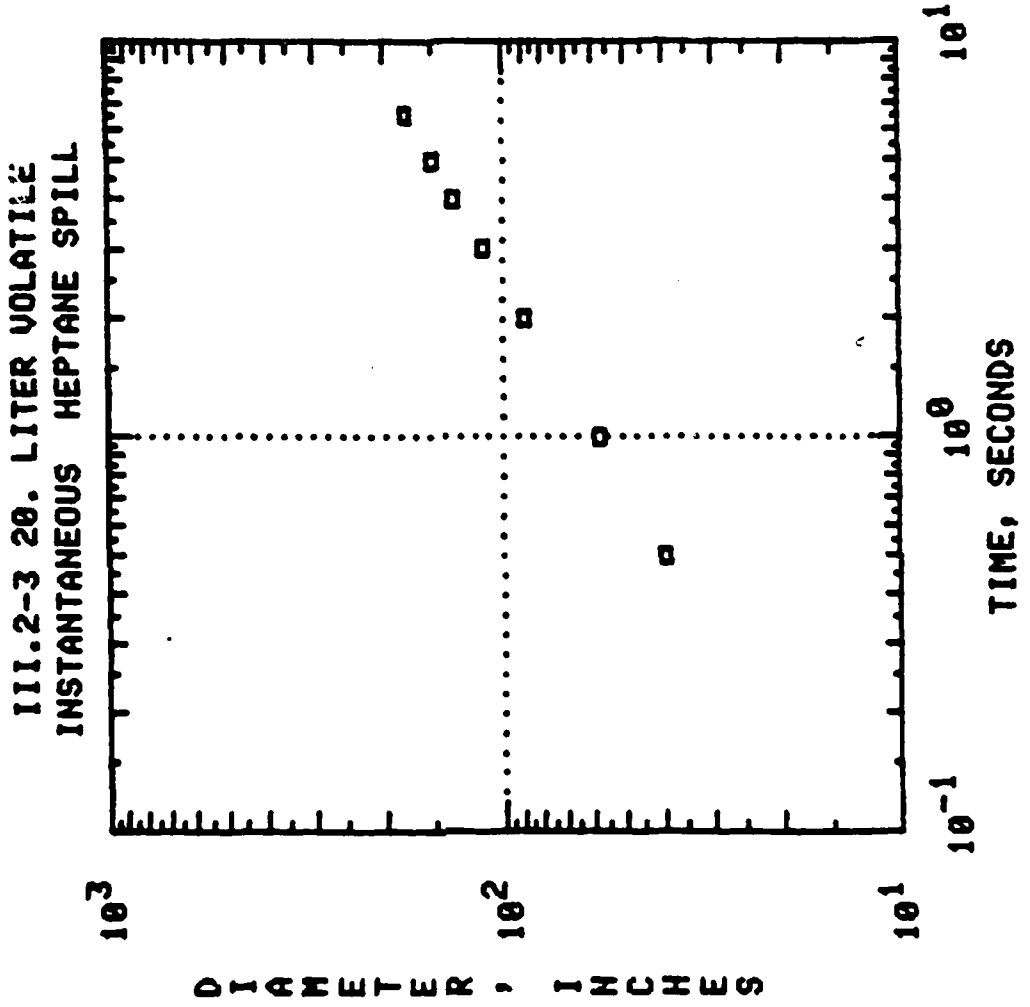

III.1-2 10. LITER VOLATILE
INSTANTANEOUS N-PENTANE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1

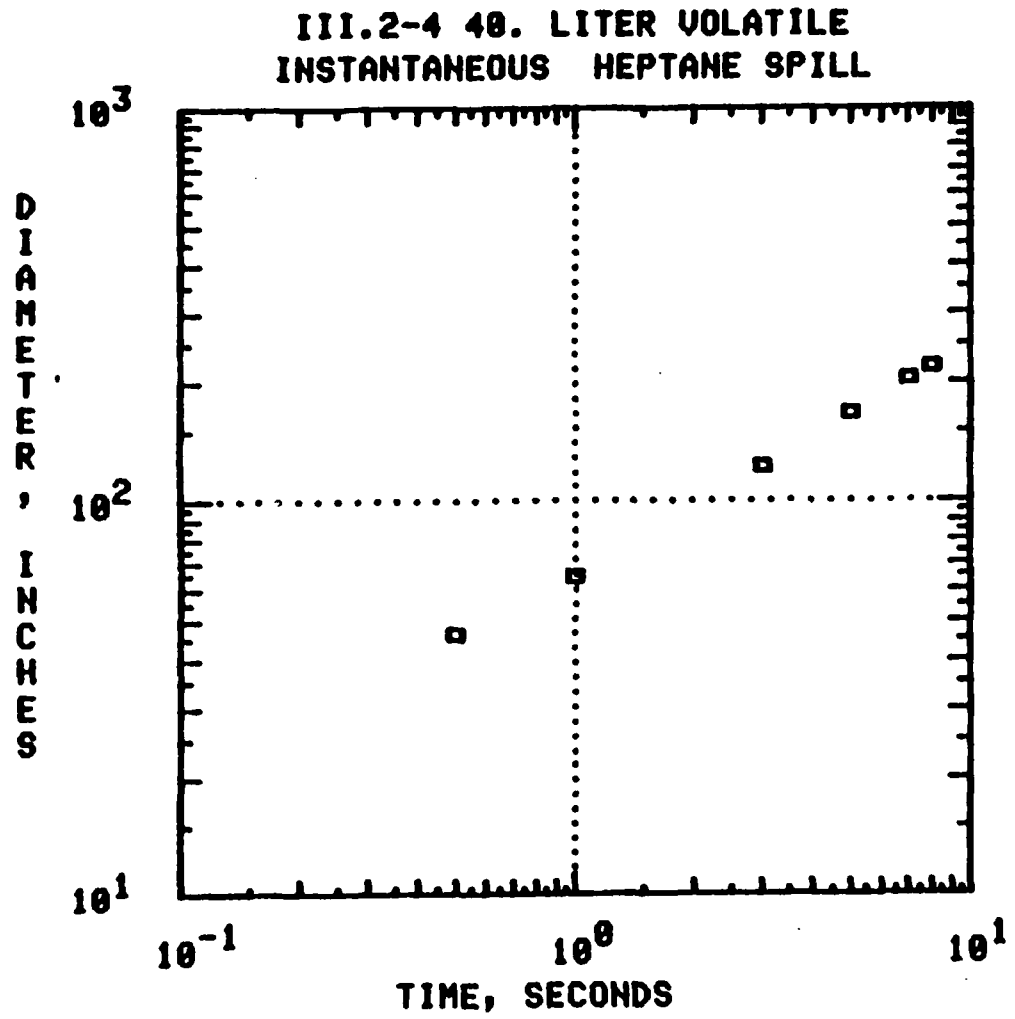

III.1-3 20. LITER VOLATILE
INSTANTANEOUS N-PENTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^{-1}
10^0
10^1
TIME, SECONDS

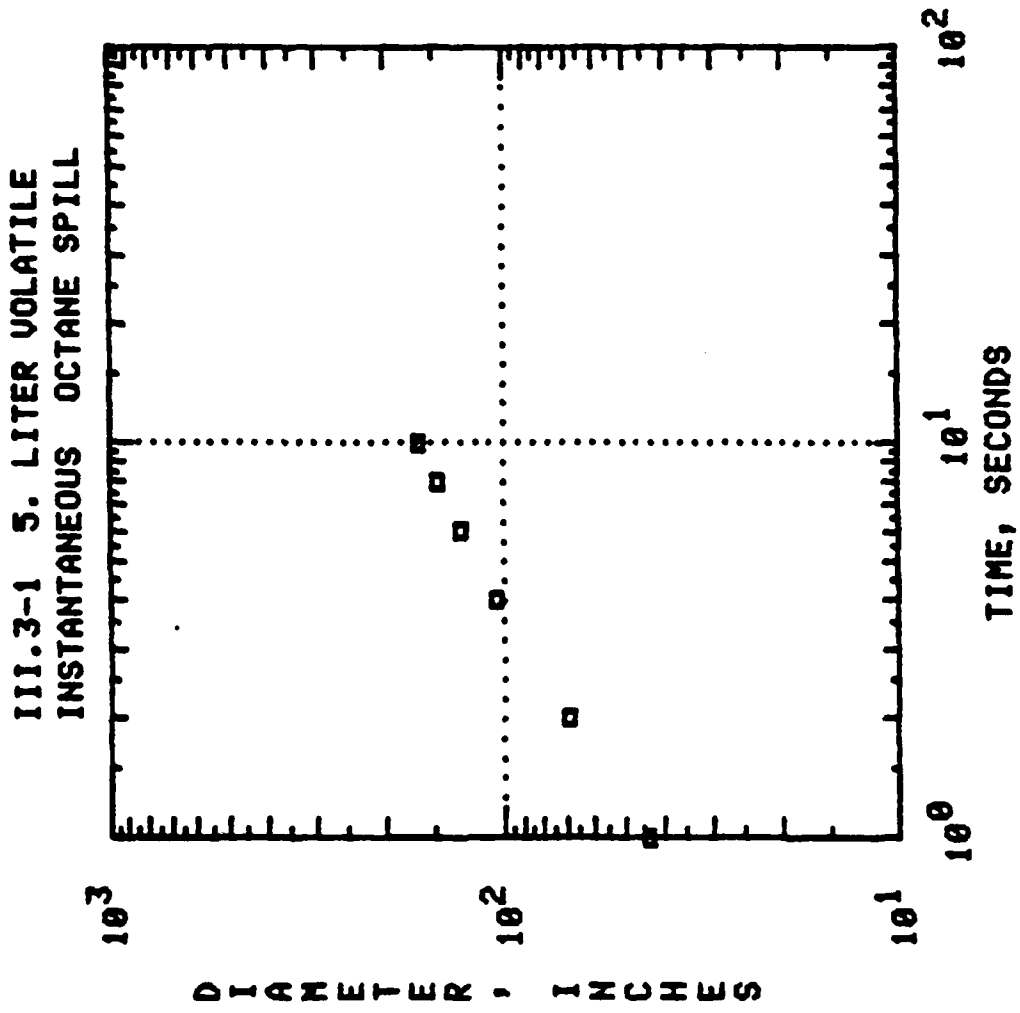

III.1-4 40. LITER VOLATILE
INSTANTANEOUS N-PENTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

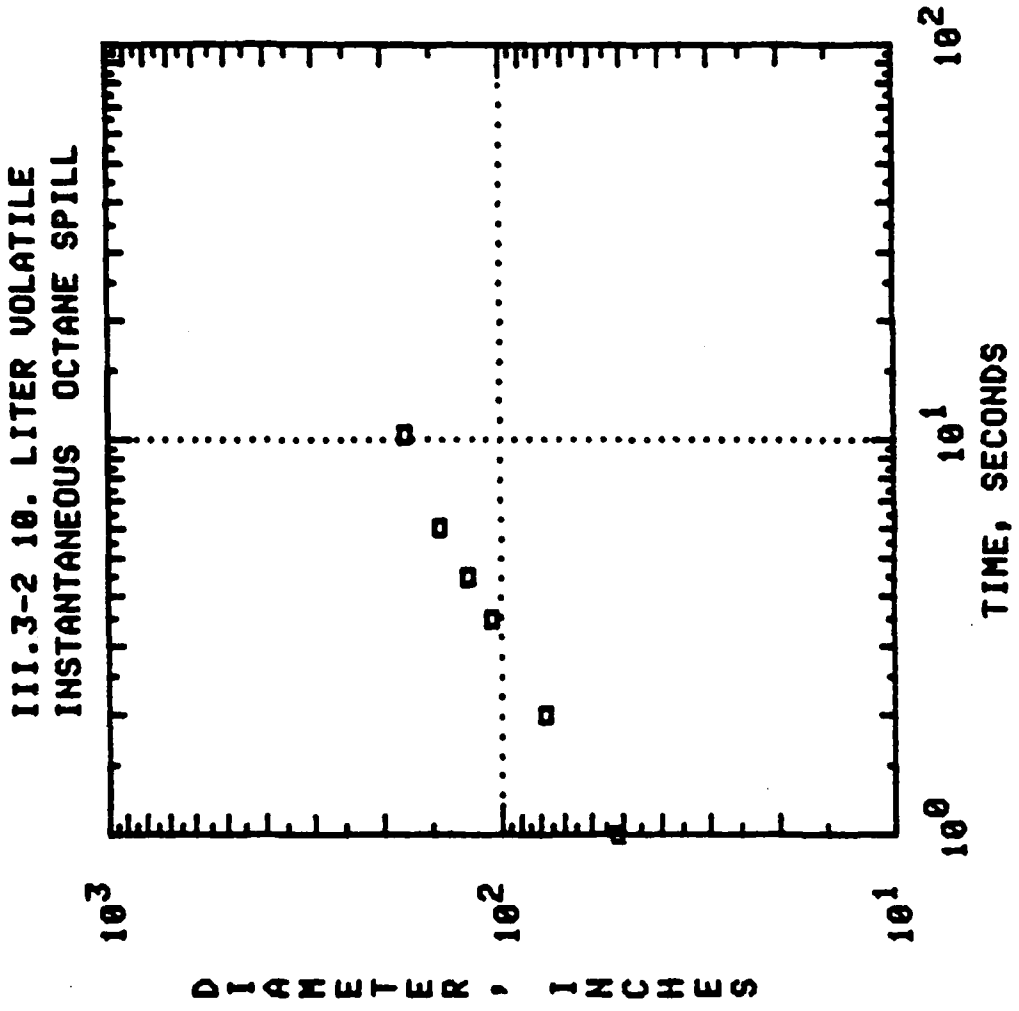

III.2-1 5. LITER VOLATILE
INSTANTANEOUS HEPTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
TIME, SECONDS

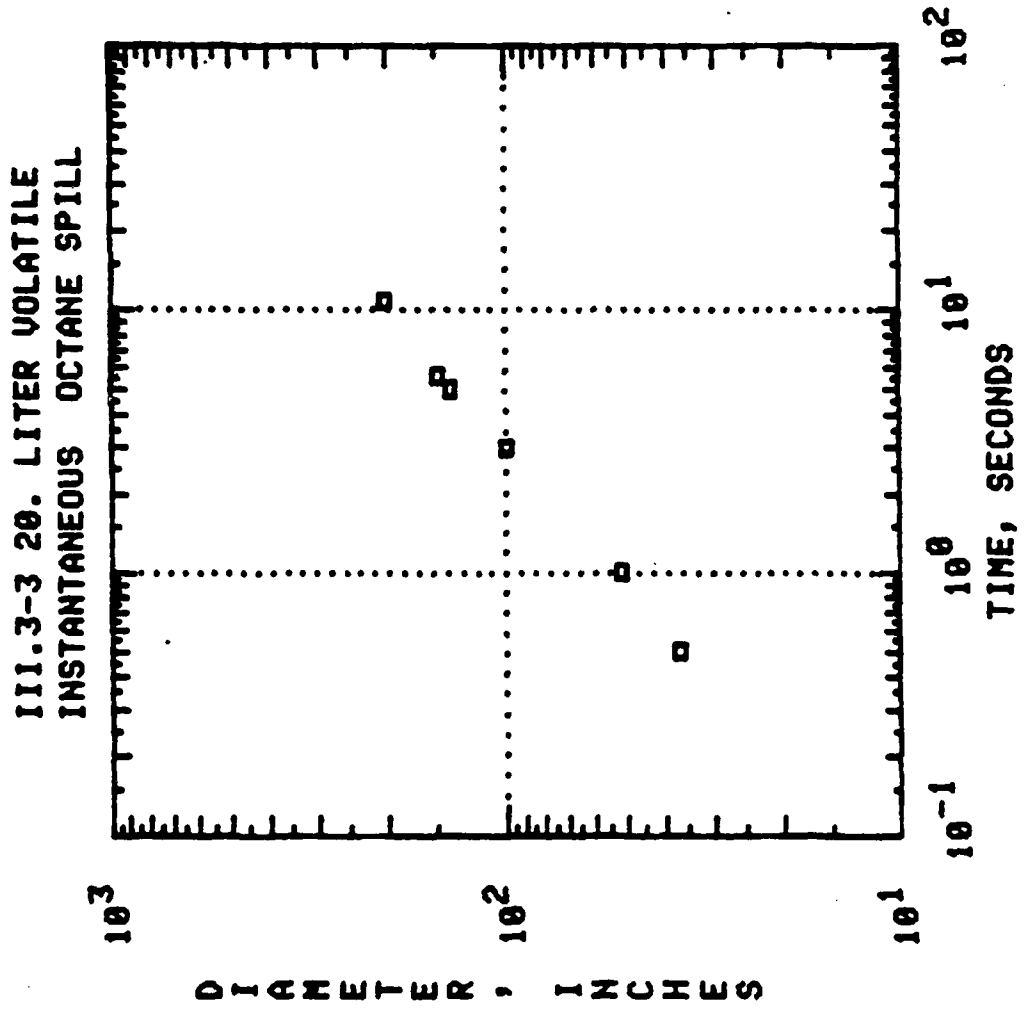

III.2-2 10. LITER VOLATILE
INSTANTANEOUS HEPTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
TIME, SECONDS

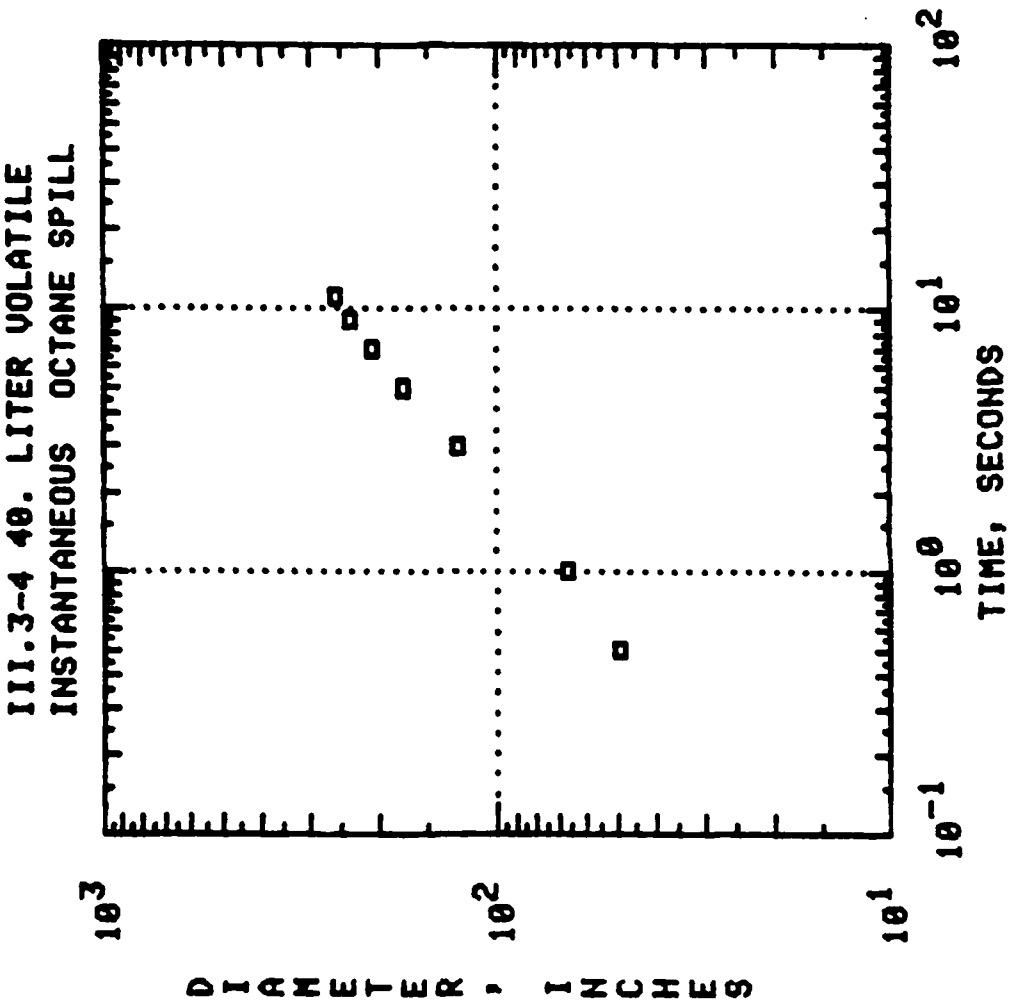

III.2-3 20. LITER VOLATILE
INSTANTANEOUS HEPTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1

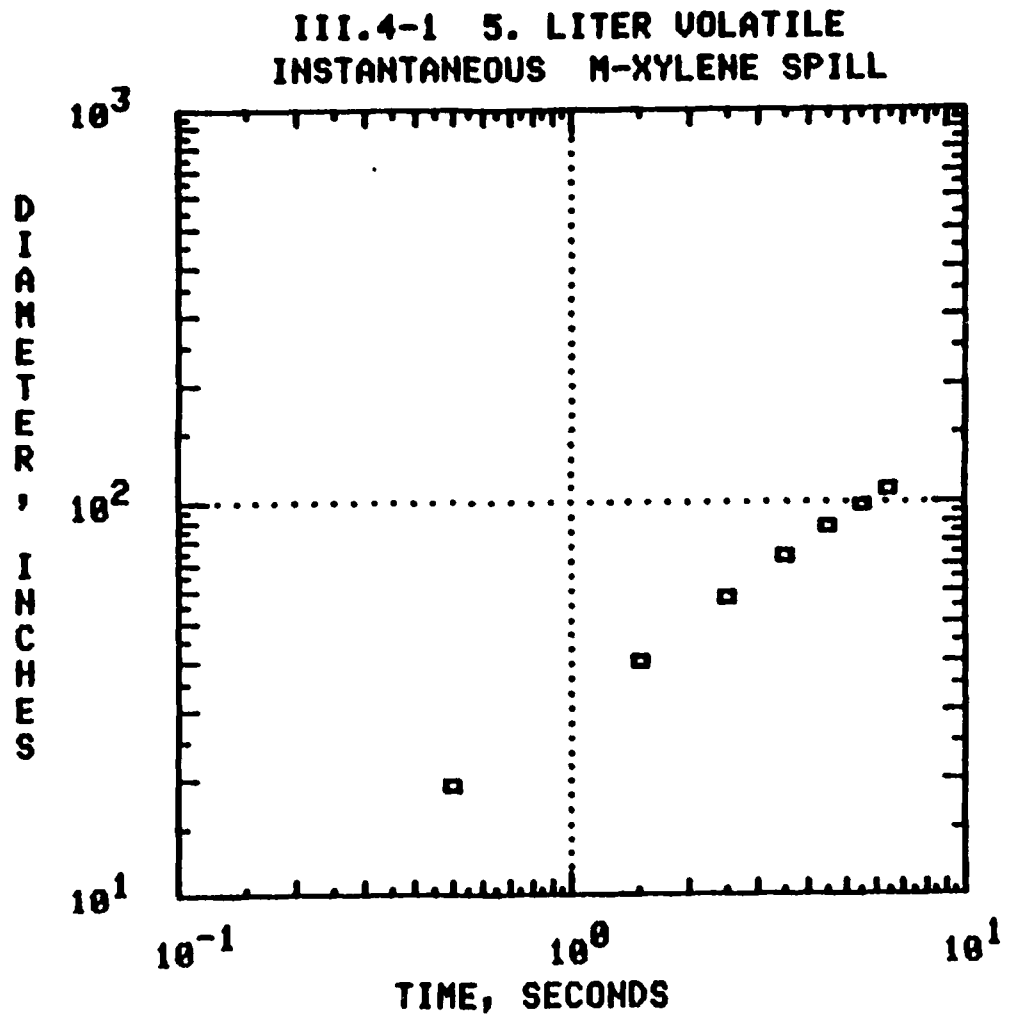

III.2-4 40. LITER VOLATILE
INSTANTANEOUS HEPTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
TIME, SECONDS

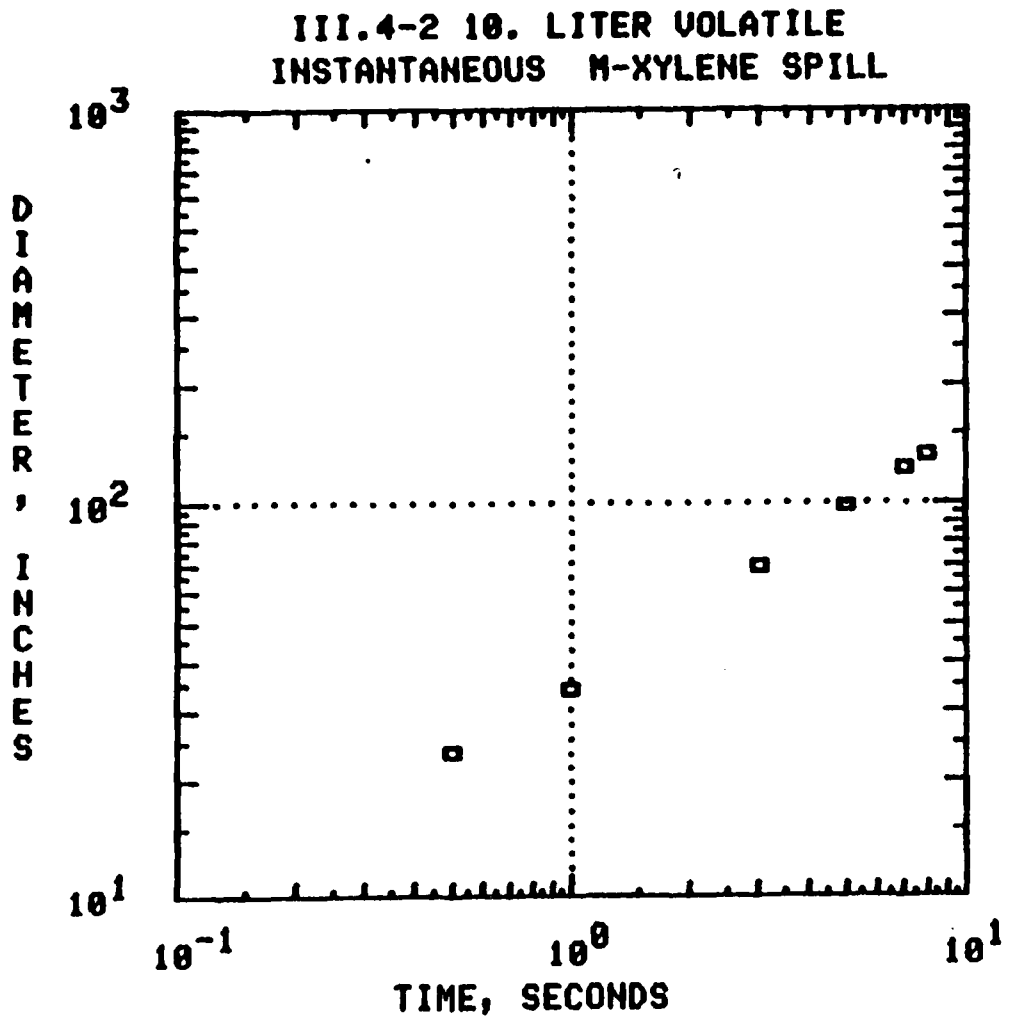

III.3-1 5. LITER VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

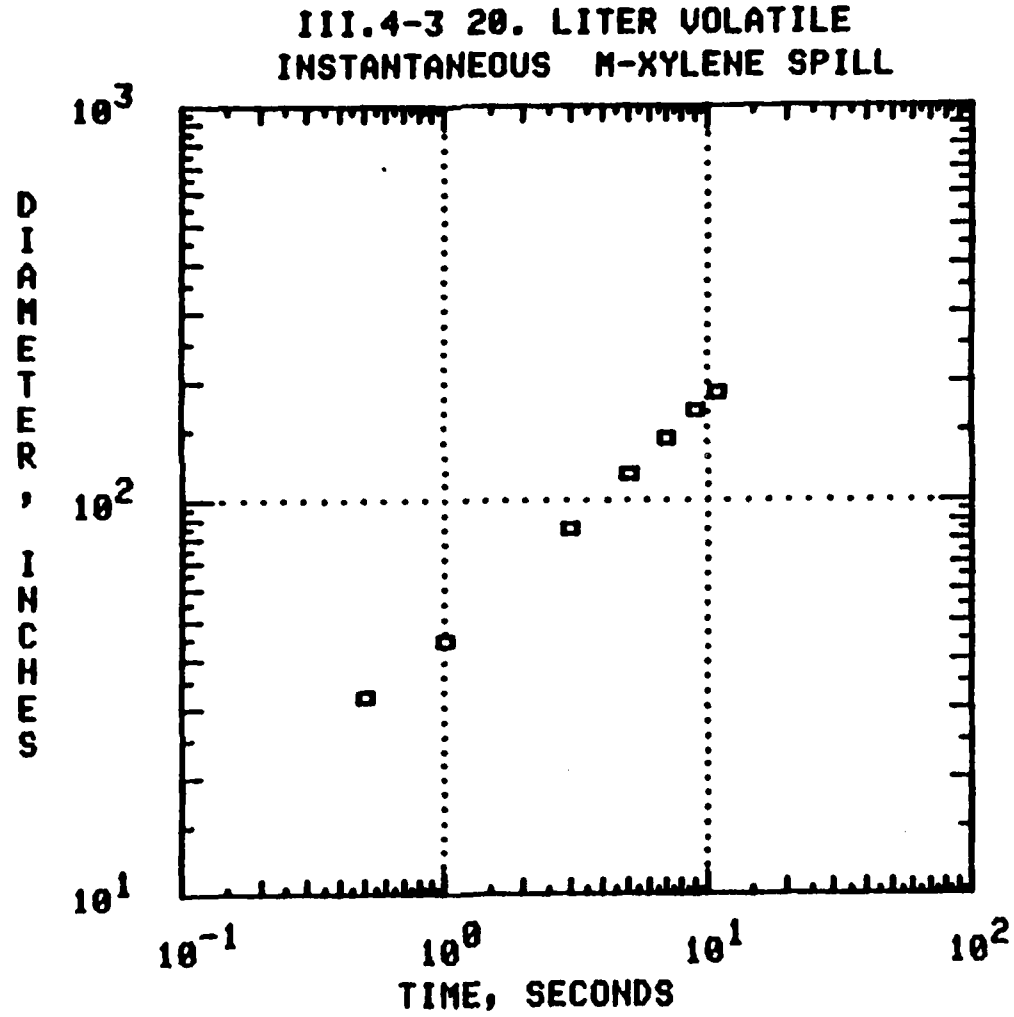

III.3-2 10. LITER VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

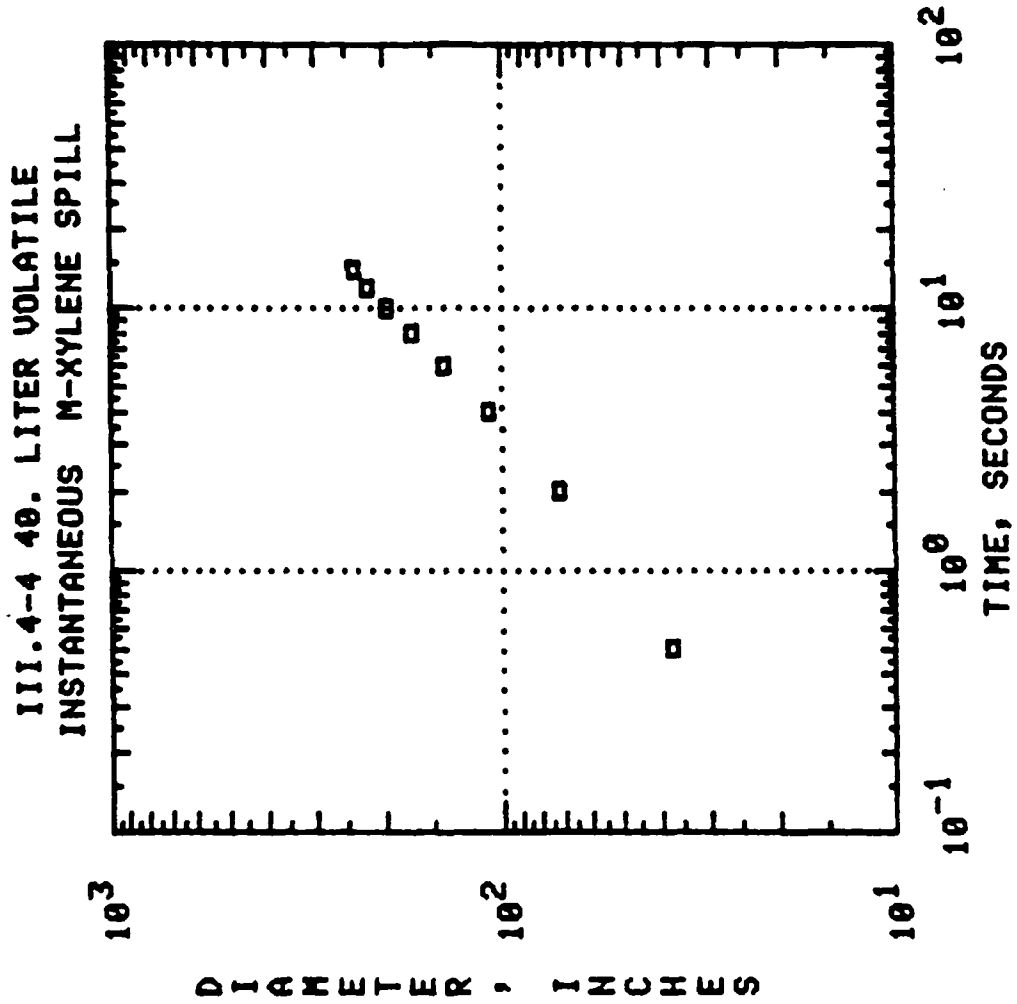

III.3-3 20. LITER VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1
10^2


III.3-4 40. LITER VOLATILE
INSTANTANEOUS OCTANE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1
10^2

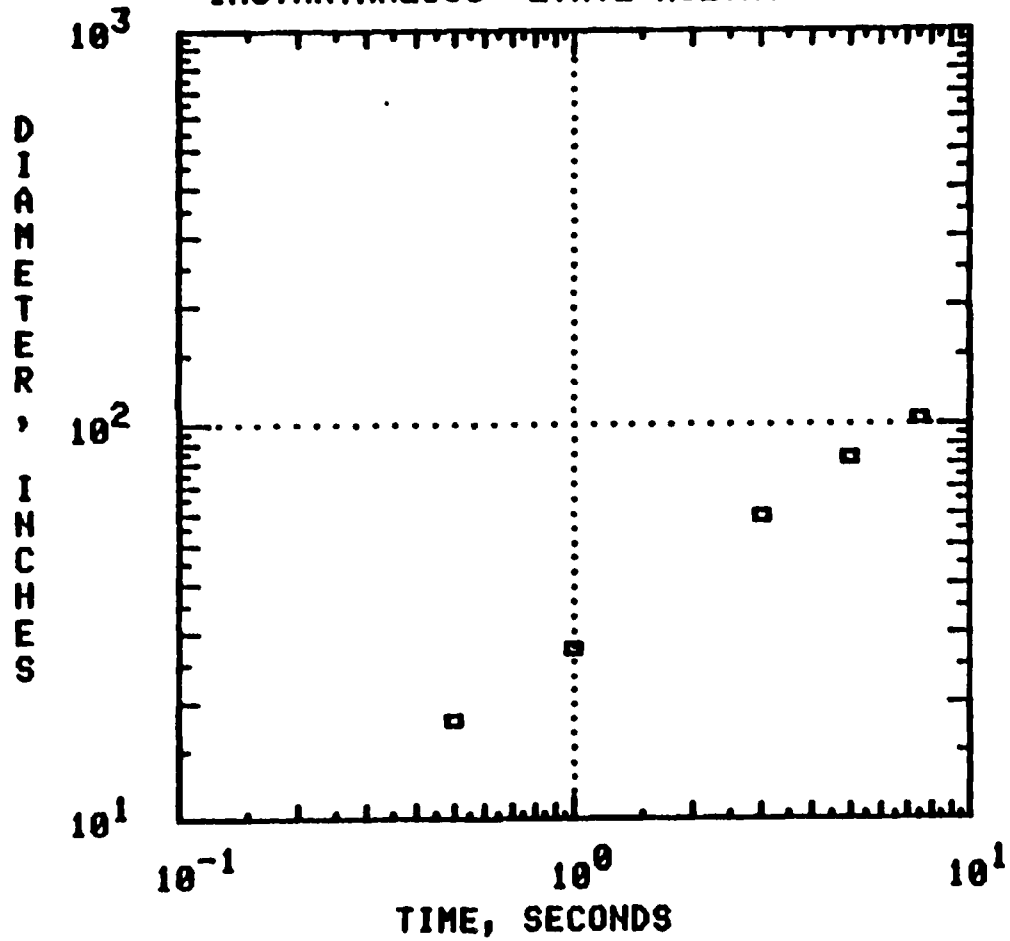

III.4-1 5. LITER VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
TIME, SECONDS

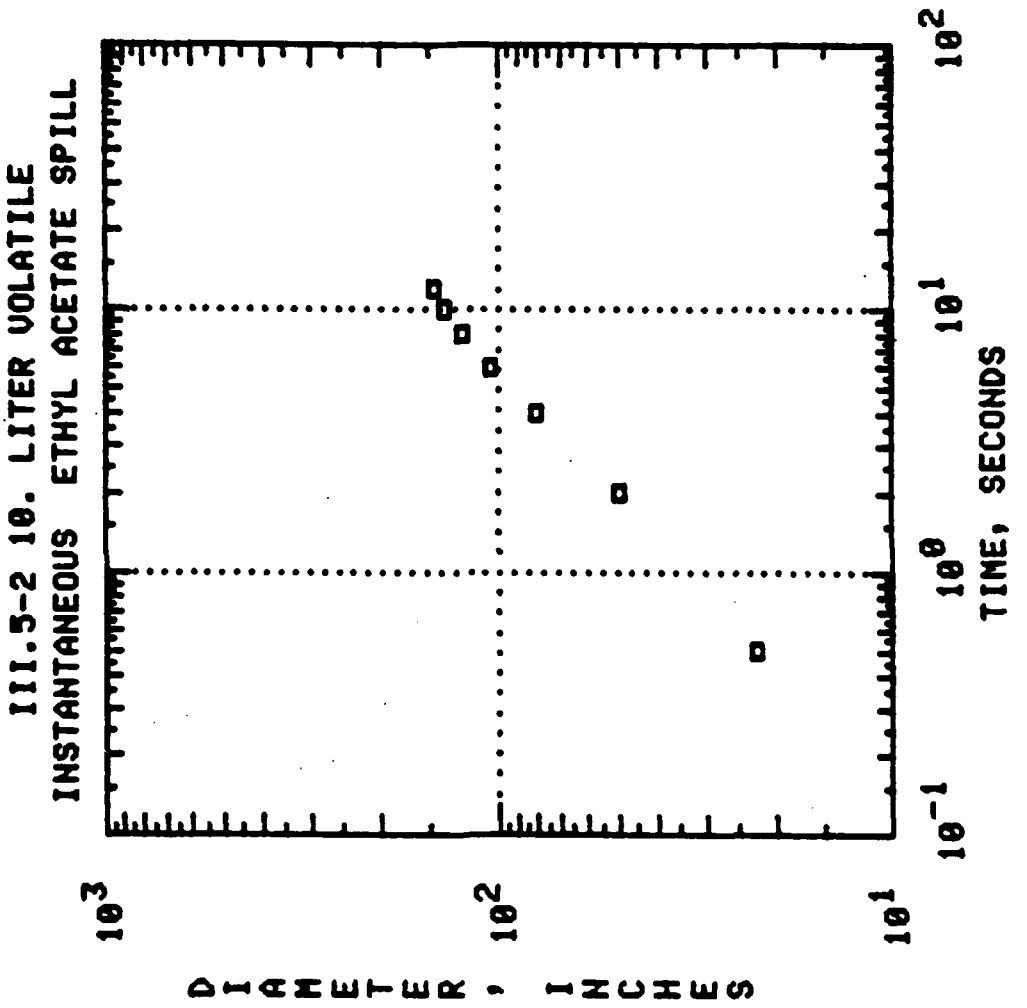

III.4-2 10. LITER VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
TIME, SECONDS

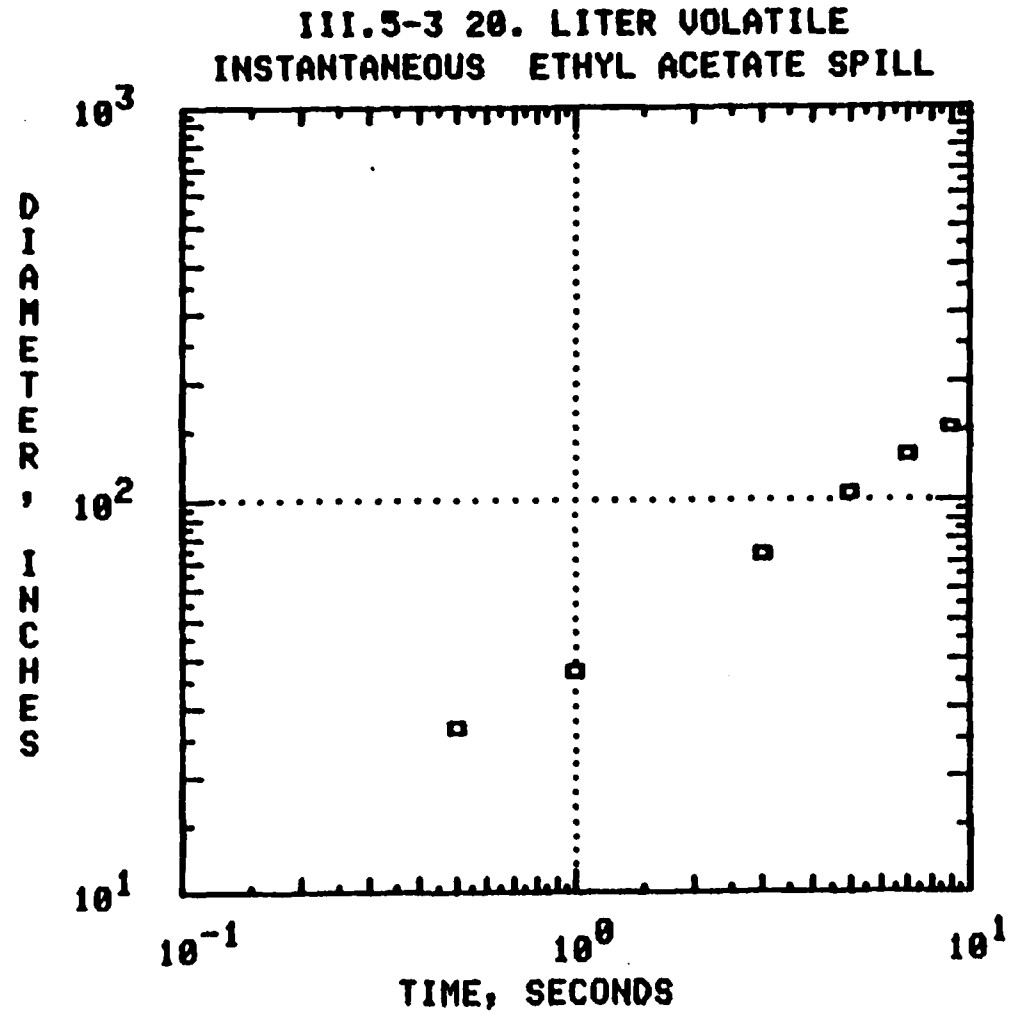

III.4-3 20. LITER VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
10^2
TIME, SECONDS

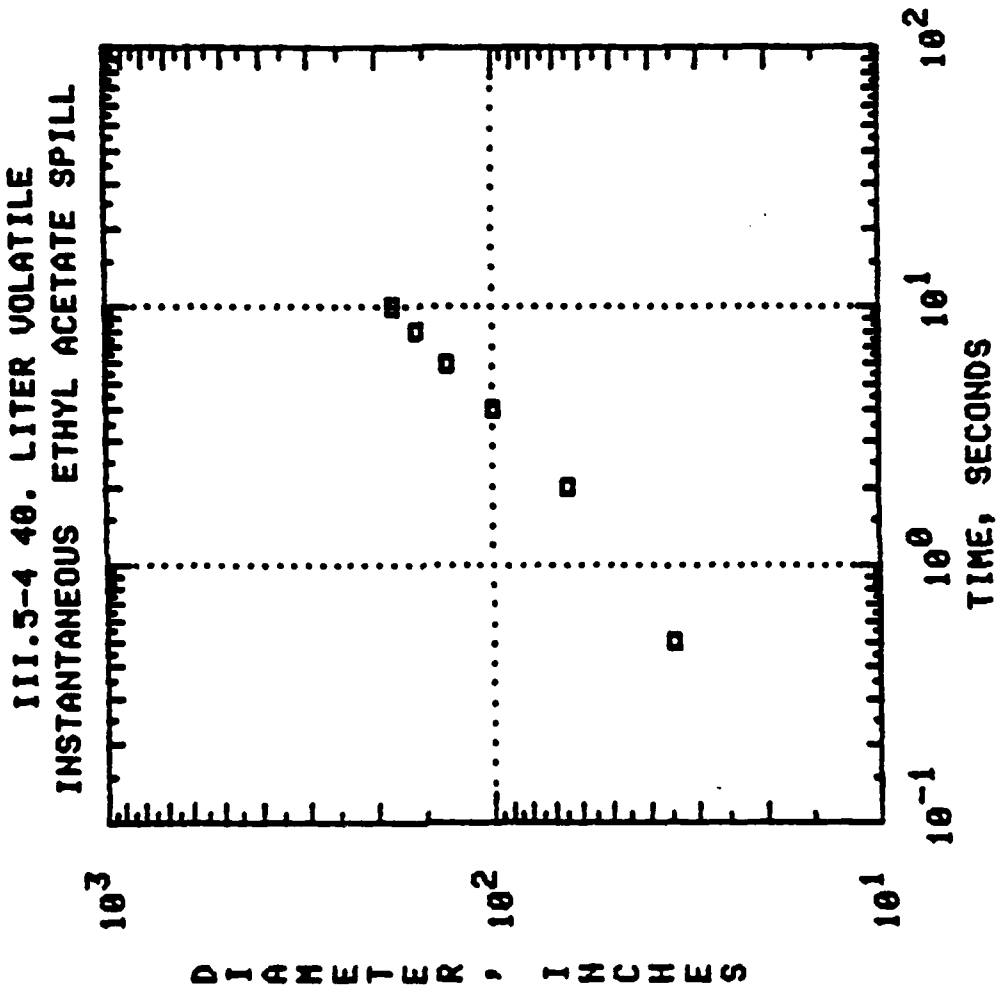

III.4-4 40. LITER VOLATILE
INSTANTANEOUS M-XYLENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1
10^2

III.5-1 5. LITER VOLATILE
INSTANTANEOUS ETHYL ACETATE SPILL




III.5-2 10. LITER VOLATILE
INSTANTANEOUS ETHYL ACETATE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1
10^2


III.5-3 20. LITER VOLATILE
INSTANTANEOUS ETHYL ACETATE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^{-1}
10^0
10^1
TIME, SECONDS

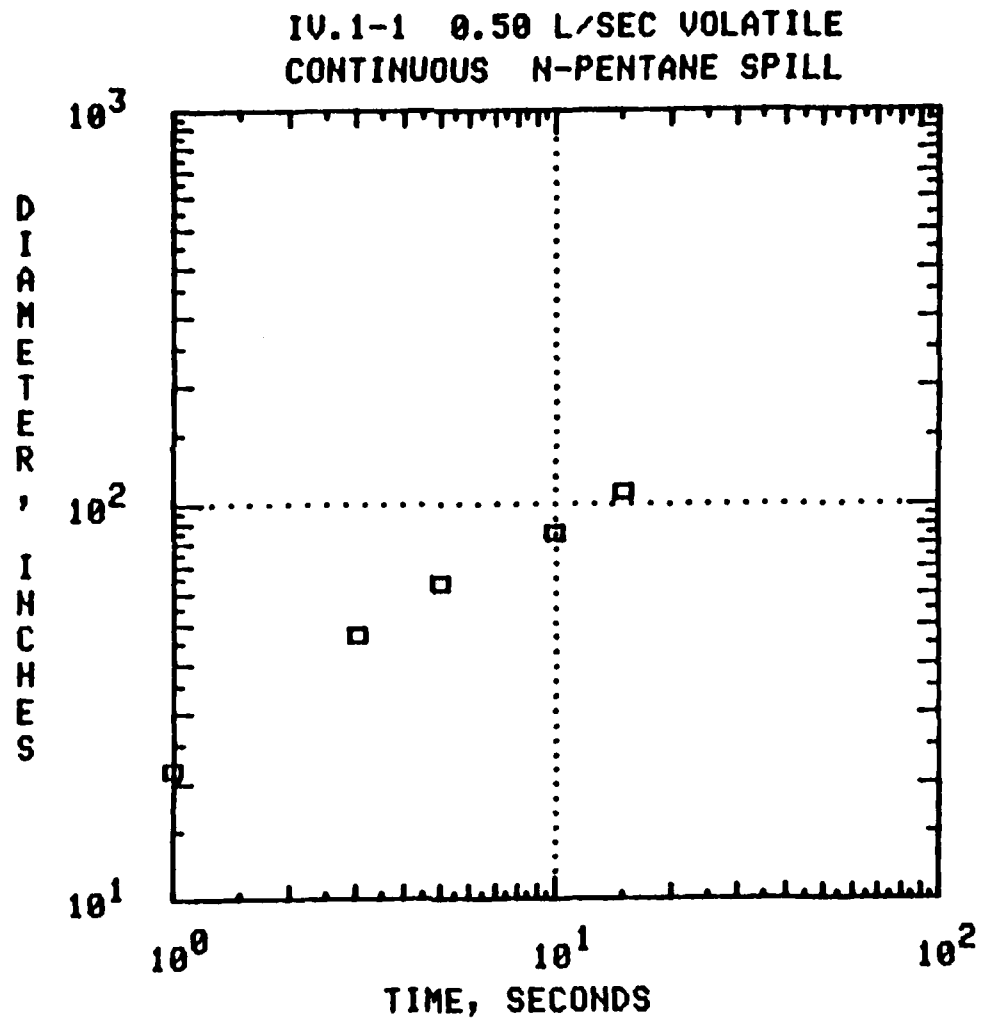

III.5-4 40. LITER VOLATILE
INSTANTANEOUS ETHYL ACETATE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^{-1}
10^0
10^1
10^2

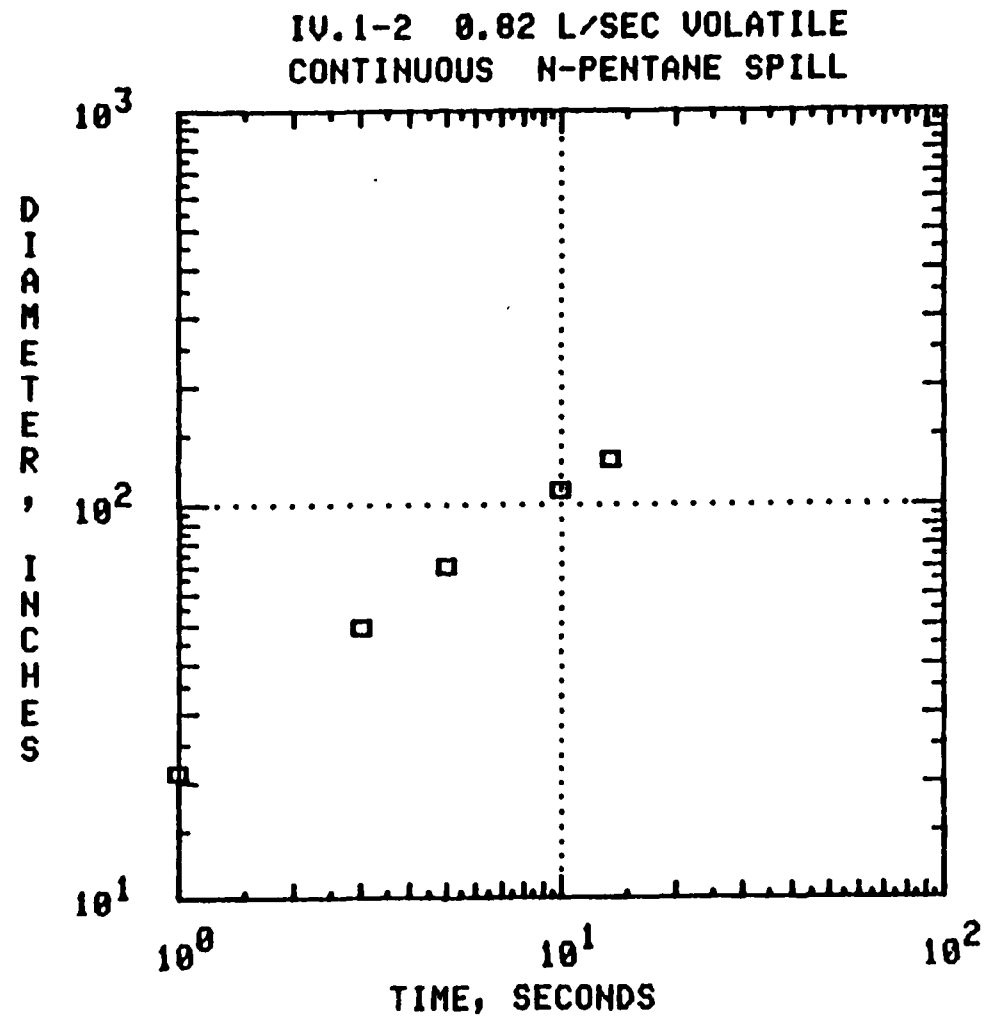
APPENDIX D

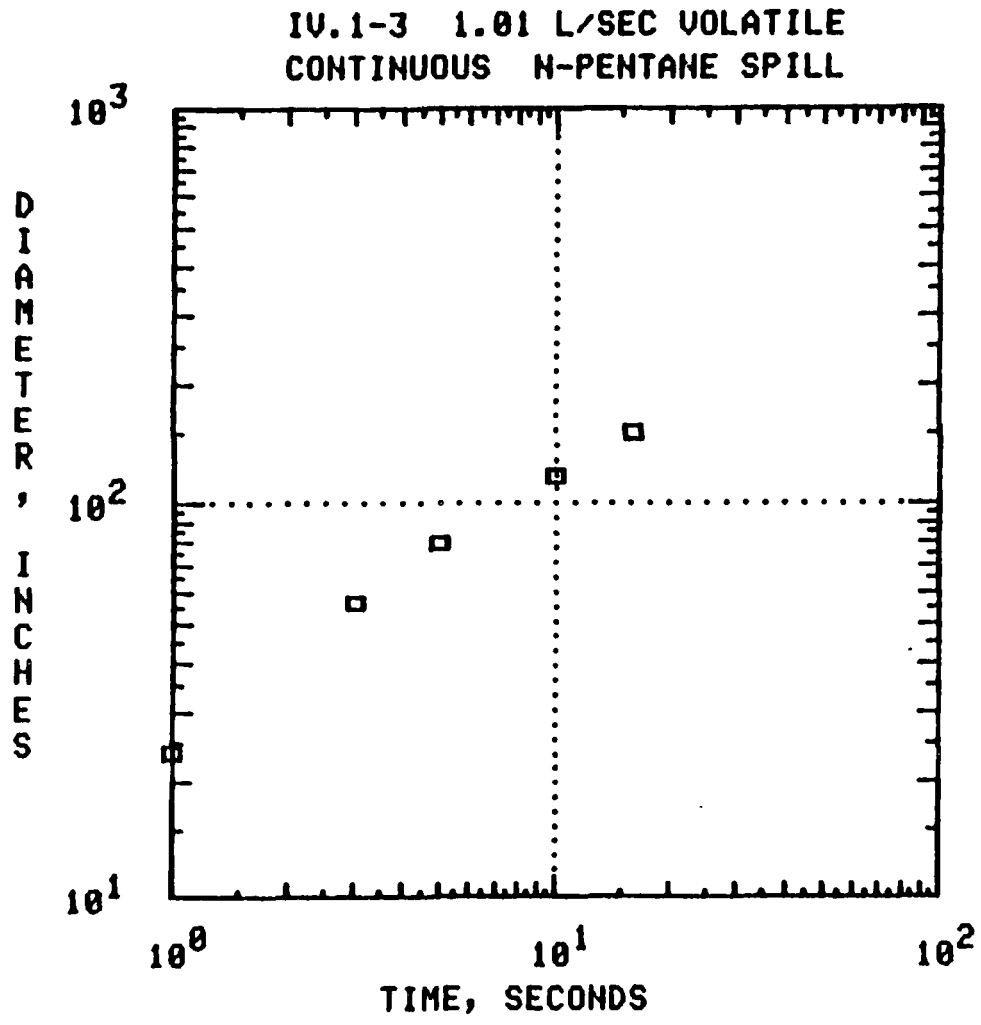
SPREADING TEST SERIES IV - VOLATILE CONTINUOUS SPILLS IN BASIN

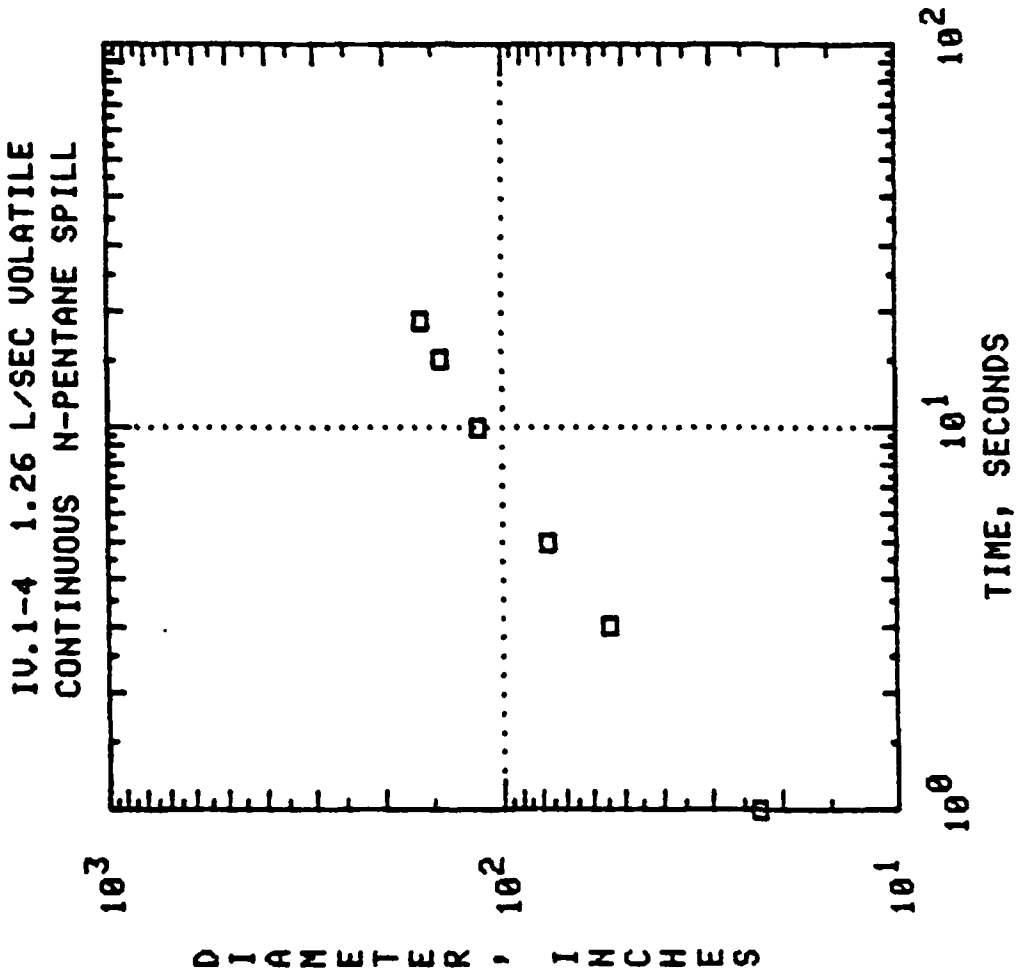
SUMMARY OF TEST CONDITIONS FOR
SPREADING TEST SERIES IV -
VOLATILE CONTINUOUS SPILLS IN BASIN

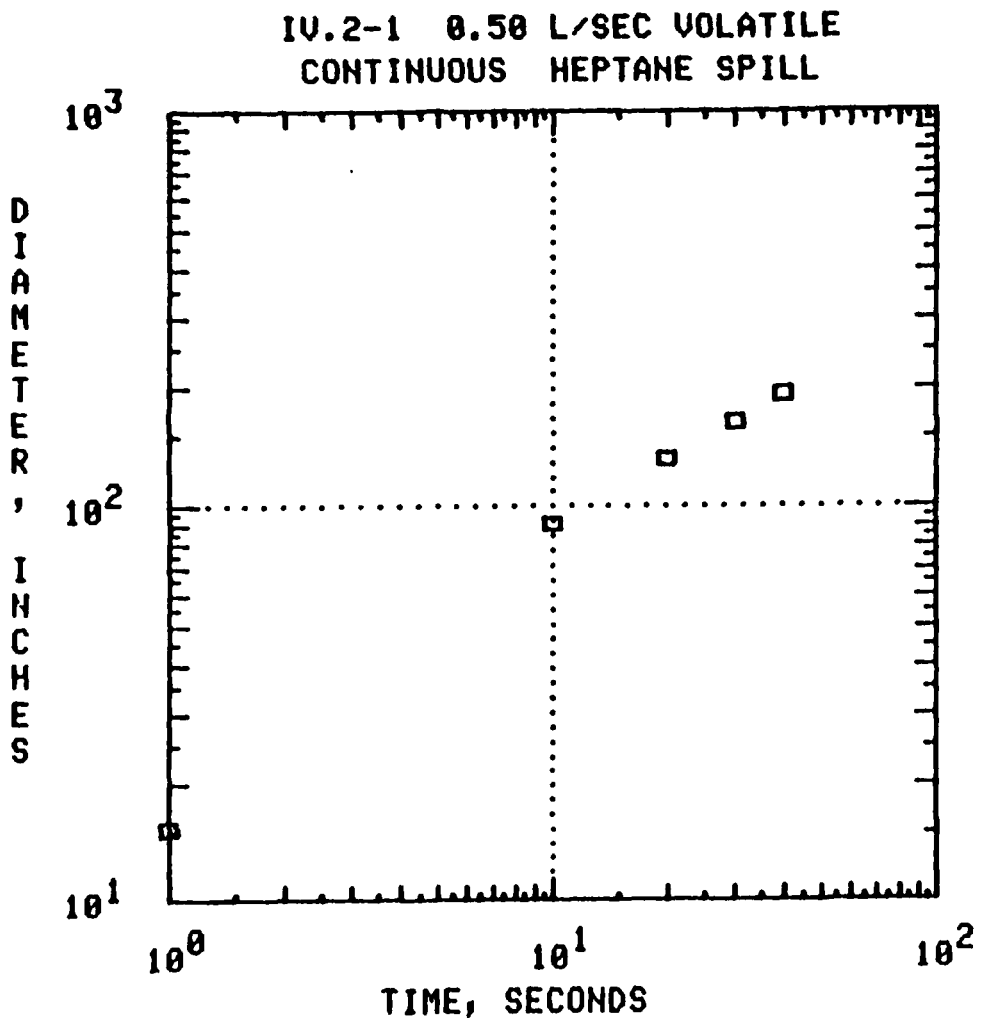
Run Number	Chemical	Specific Gravity	σ_{sp} Coef.	Spill Diameter	Spill Rate (liters/sec)	Wind Speed (m/s)
IV.1-1	n-Pentane	0.626	6.5	7.3	0.50	3.53
IV.1-2					0.82	1.68
IV.1-3					1.01	1.94
IV.1-4					1.26	2.62
IV.2-1	Heptane	0.684	1.6	7.6	0.50	1.57
IV.2-2					0.82	0.74
IV.2-3					1.01	4.29
IV.2-4					1.26	4.29
IV.3-1	Octane	0.703	0.3	7.6	0.50	0.87
IV.3-2					0.82	1.30
IV.3-3					1.01	1.36
IV.3-4					1.26	1.24
IV.4-1	m-Xylene	0.864	7.0	7.6	0.50	2.05
IV.4-2					0.82	0.94
IV.4-3					1.01	1.15
IV.4-4					1.26	1.11
IV.5-1	Ethyl Acetate	0.901	45.89	7.6	0.50	0.67
IV.5-2					0.82	0.80
IV.5-3					1.01	1.53
IV.5-4					1.26	1.80

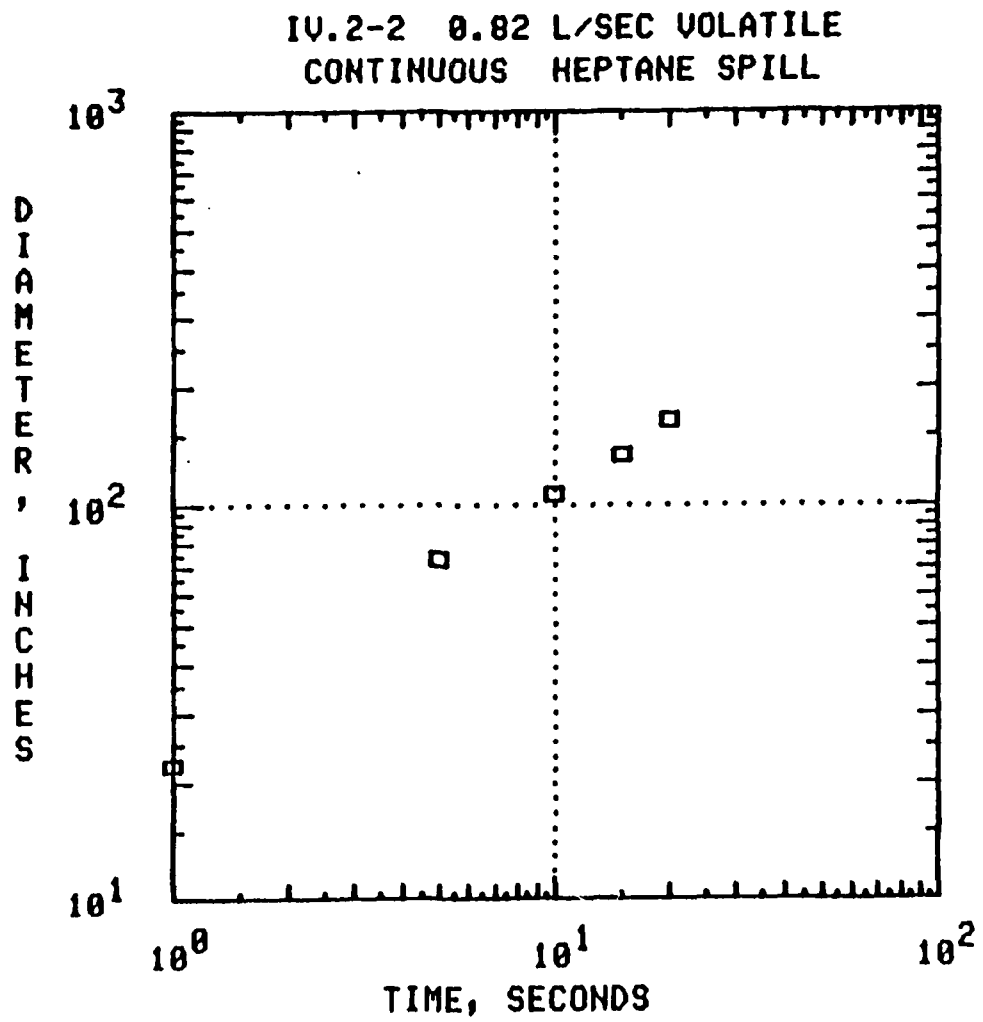

IV.1-1 0.50 L/SEC VOLATILE
CONTINUOUS N-PENTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

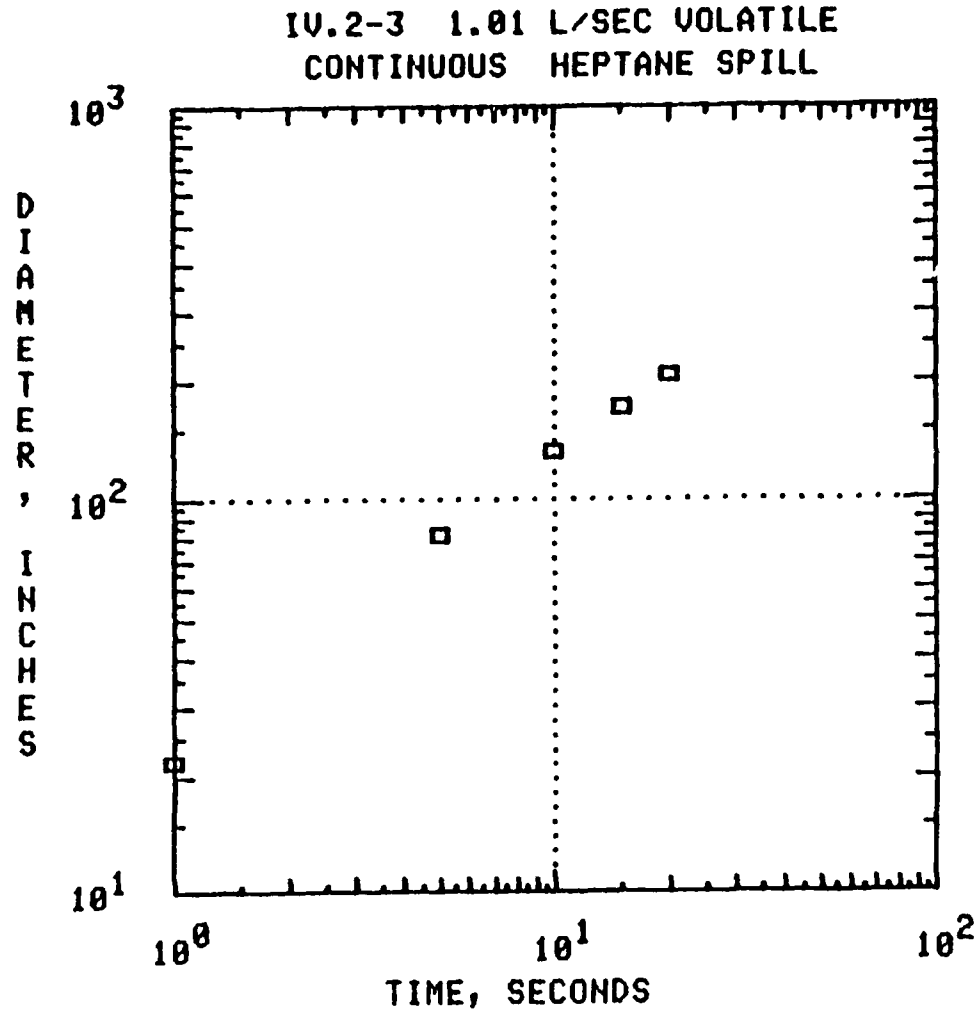

IV.1-2 0.82 L/SEC VOLATILE
CONTINUOUS N-PENTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

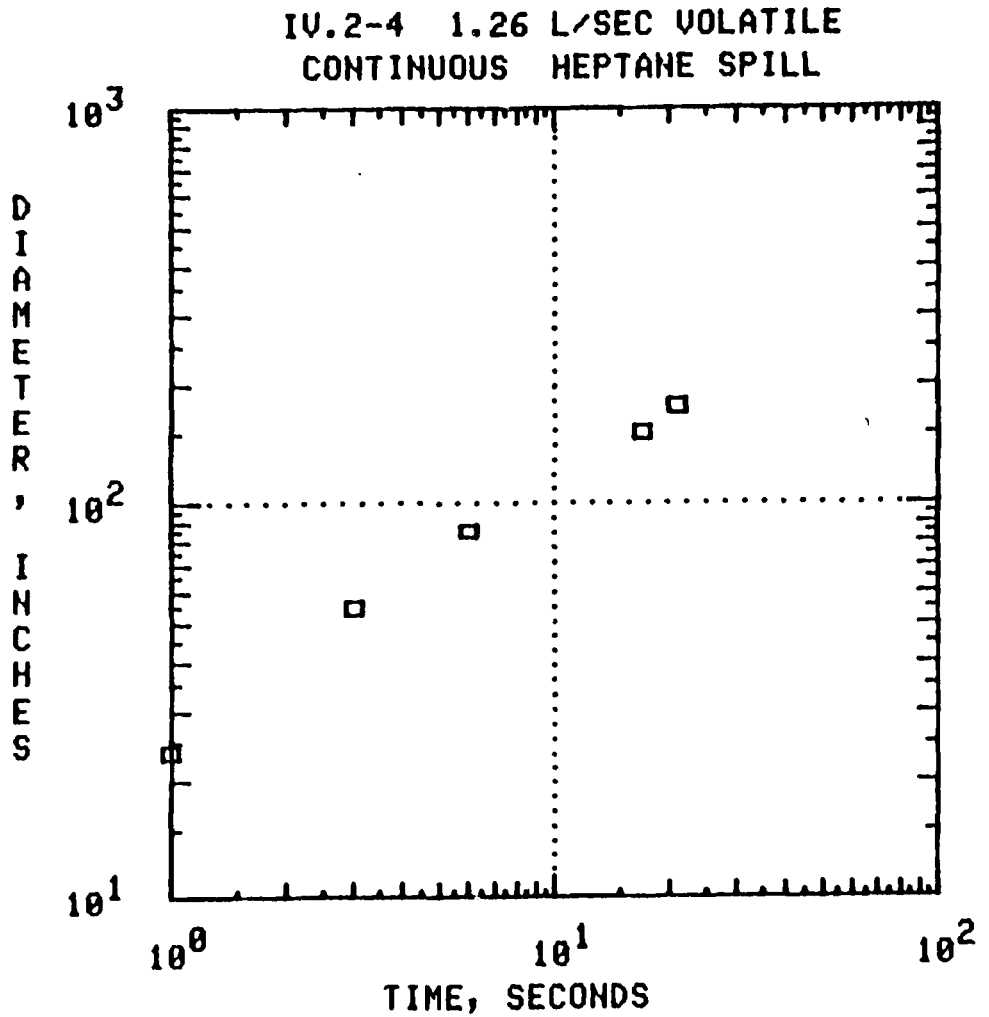

IV.1-3 1.01 L/SEC VOLATILE
CONTINUOUS N-PENTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

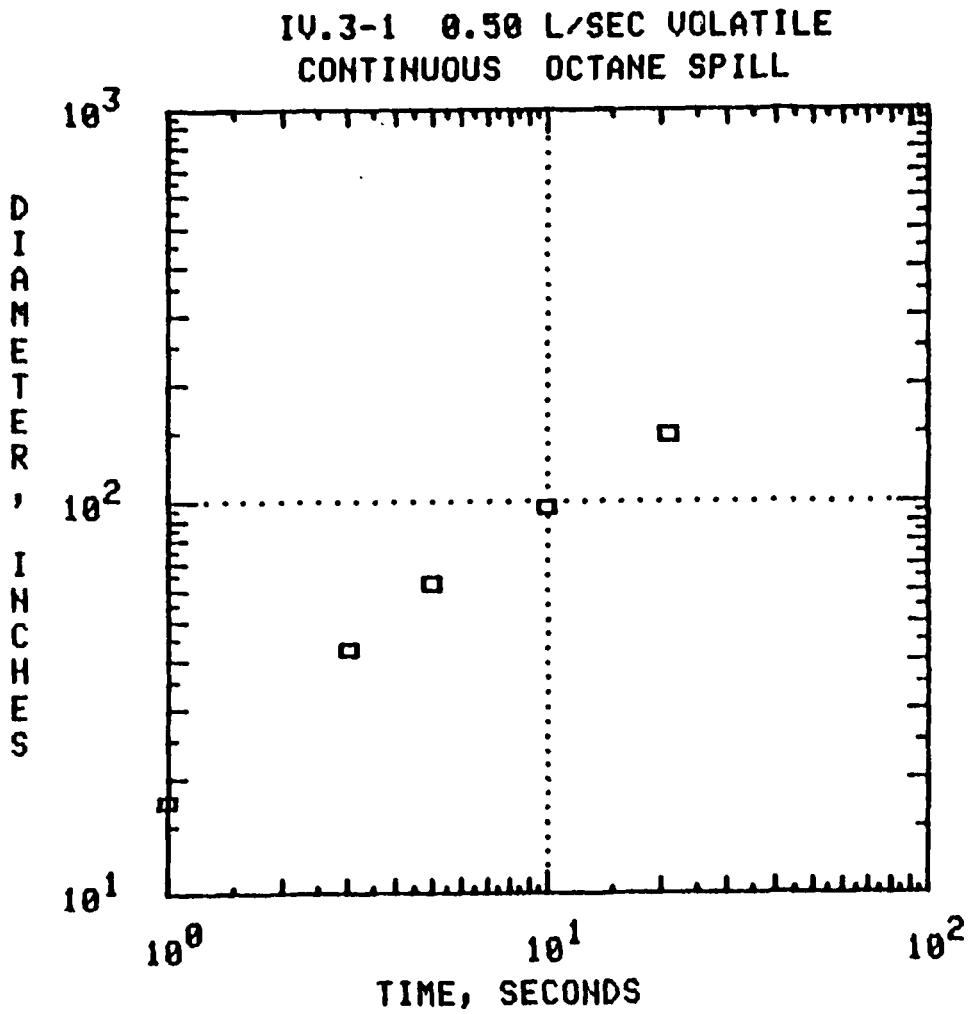

IV.1-4 1.26 L/SEC VOLATILE
CONTINUOUS N-PENTANE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

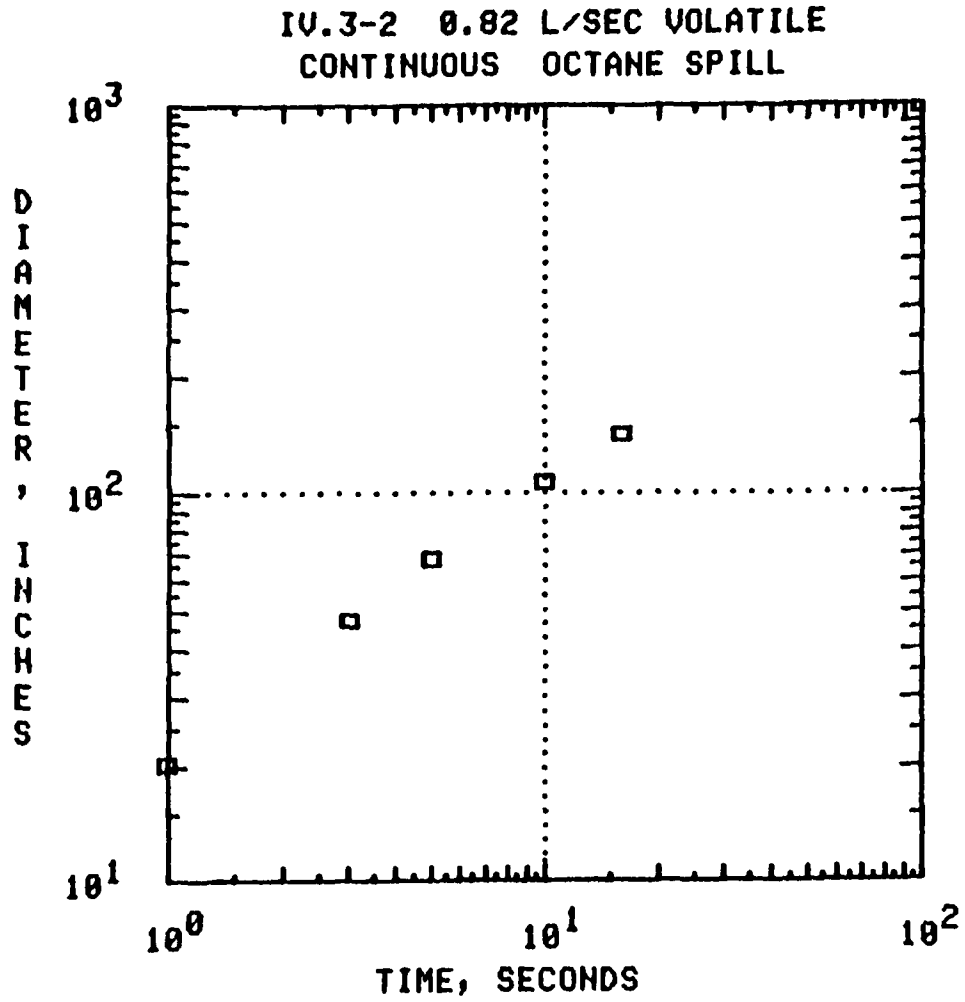

IV.2-1 0.50 L/SEC VOLATILE
CONTINUOUS HEPTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

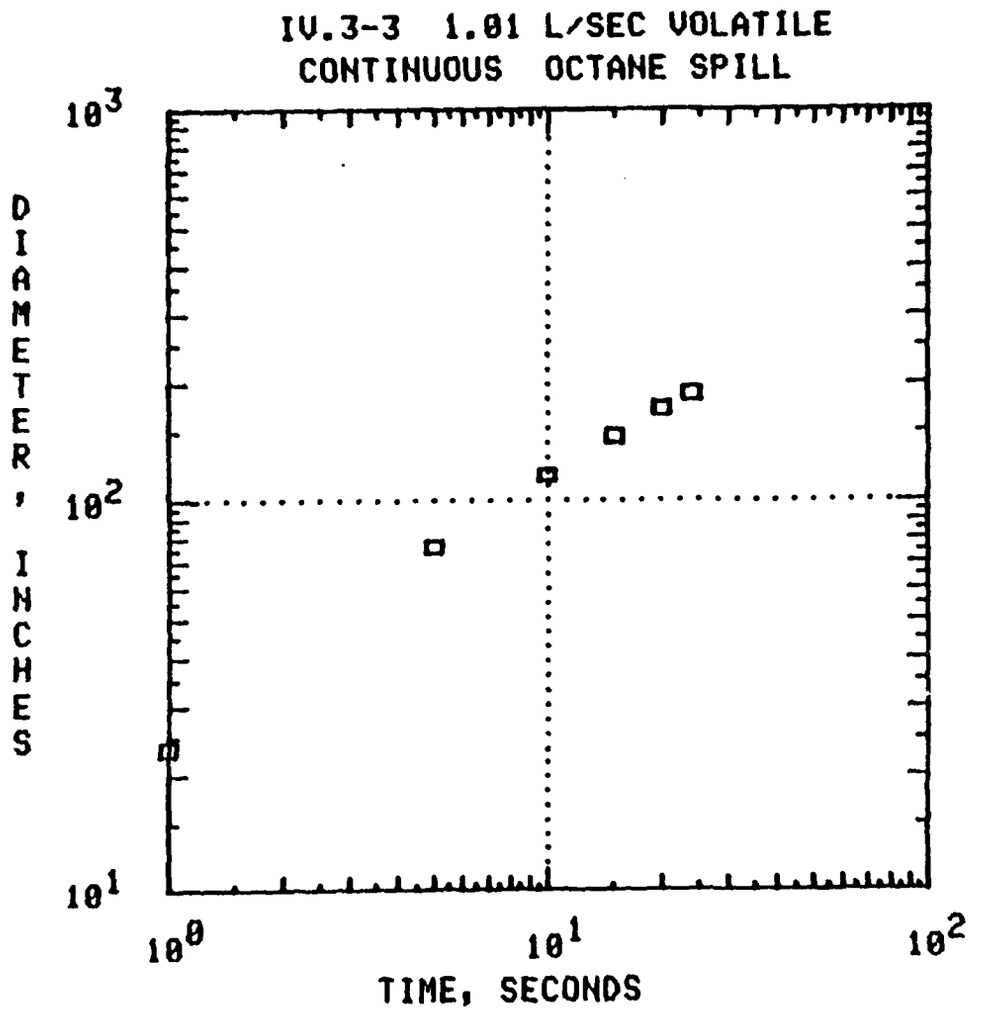

IV.2-2 0.82 L/SEC VOLATILE
CONTINUOUS HEPTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

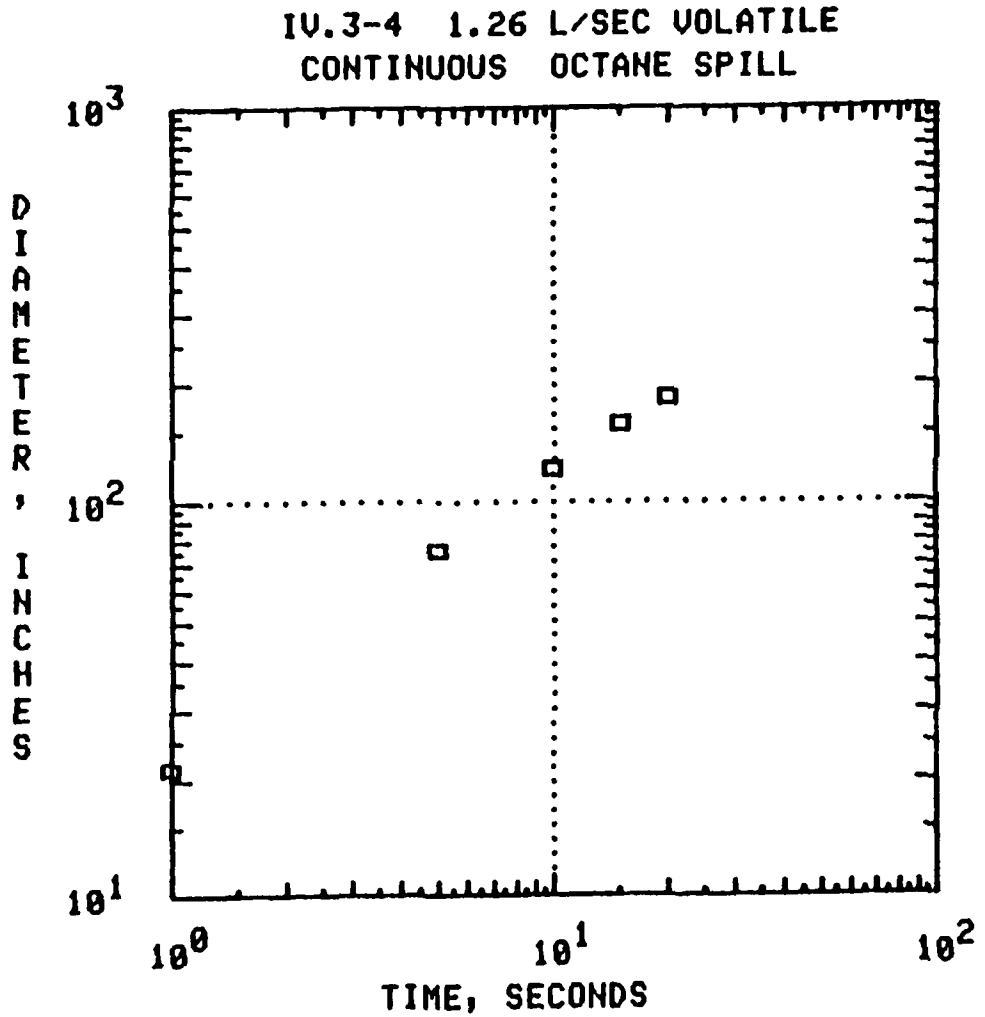

IV.2-3 1.01 L/SEC VOLATILE
CONTINUOUS HEPTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

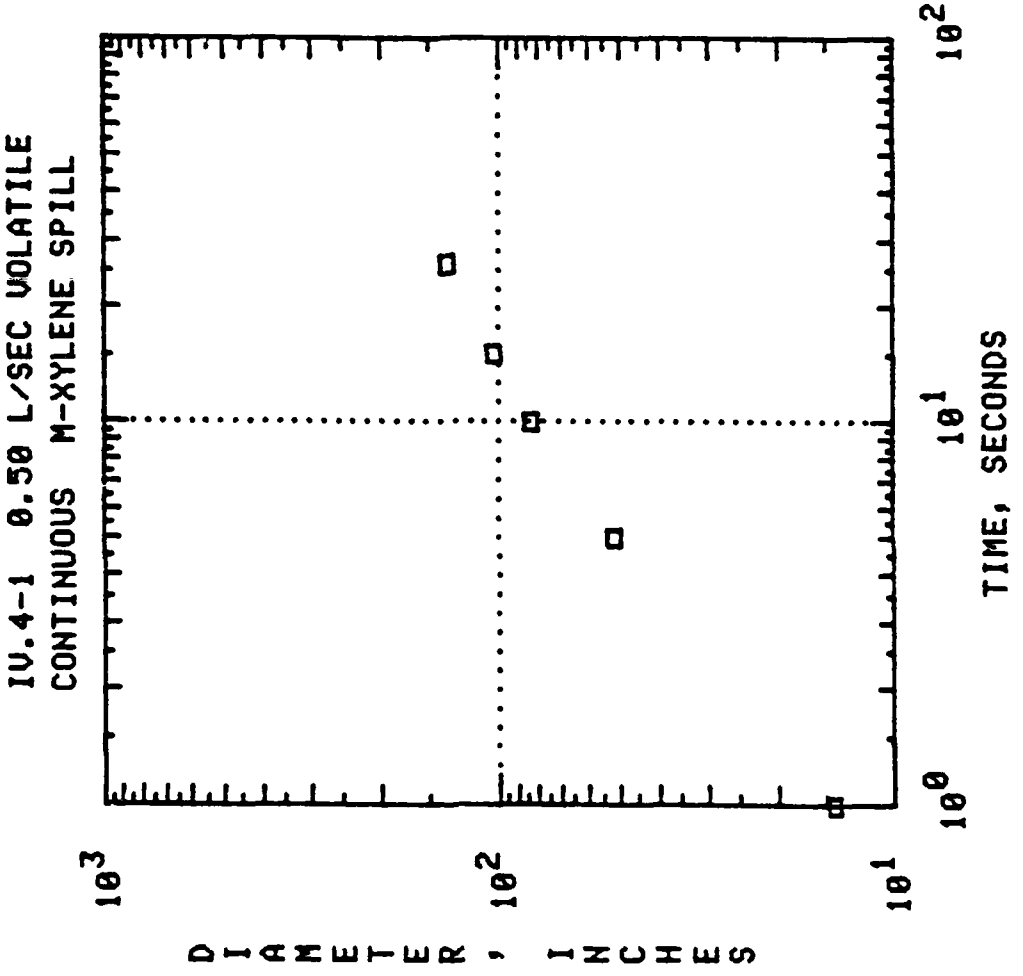

IV.2-4 1.26 L/SEC VOLATILE
CONTINUOUS HEPTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

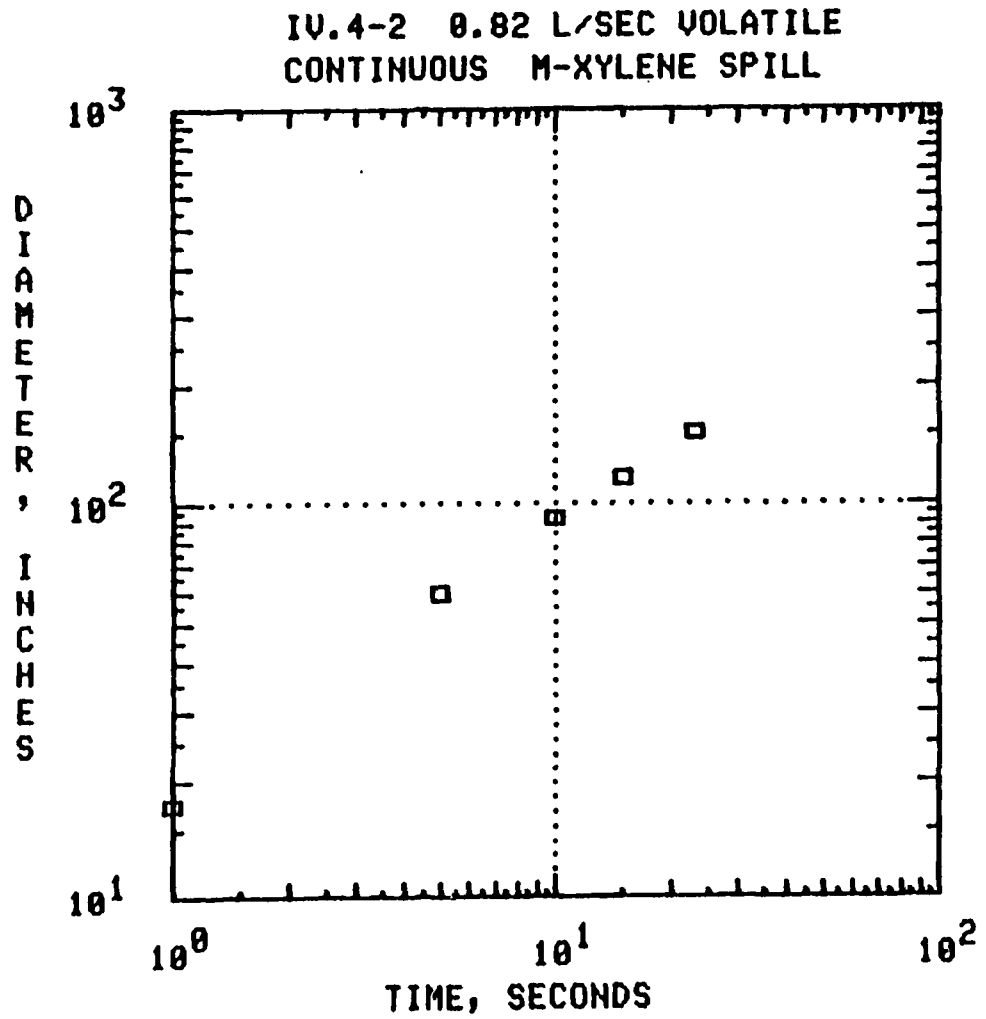

IV.3-1 0.50 L/SEC VOLATILE
CONTINUOUS OCTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

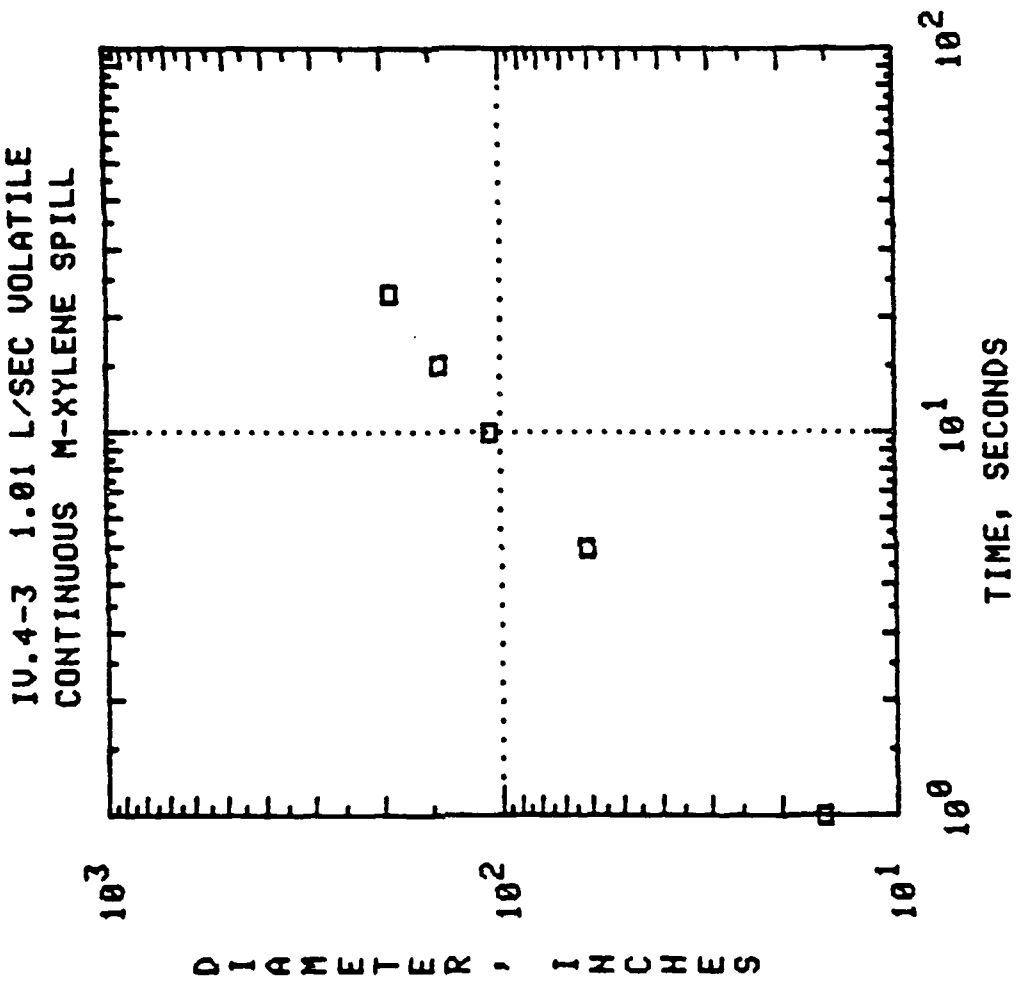

IV.3-2 0.82 L/SEC VOLATILE
CONTINUOUS OCTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

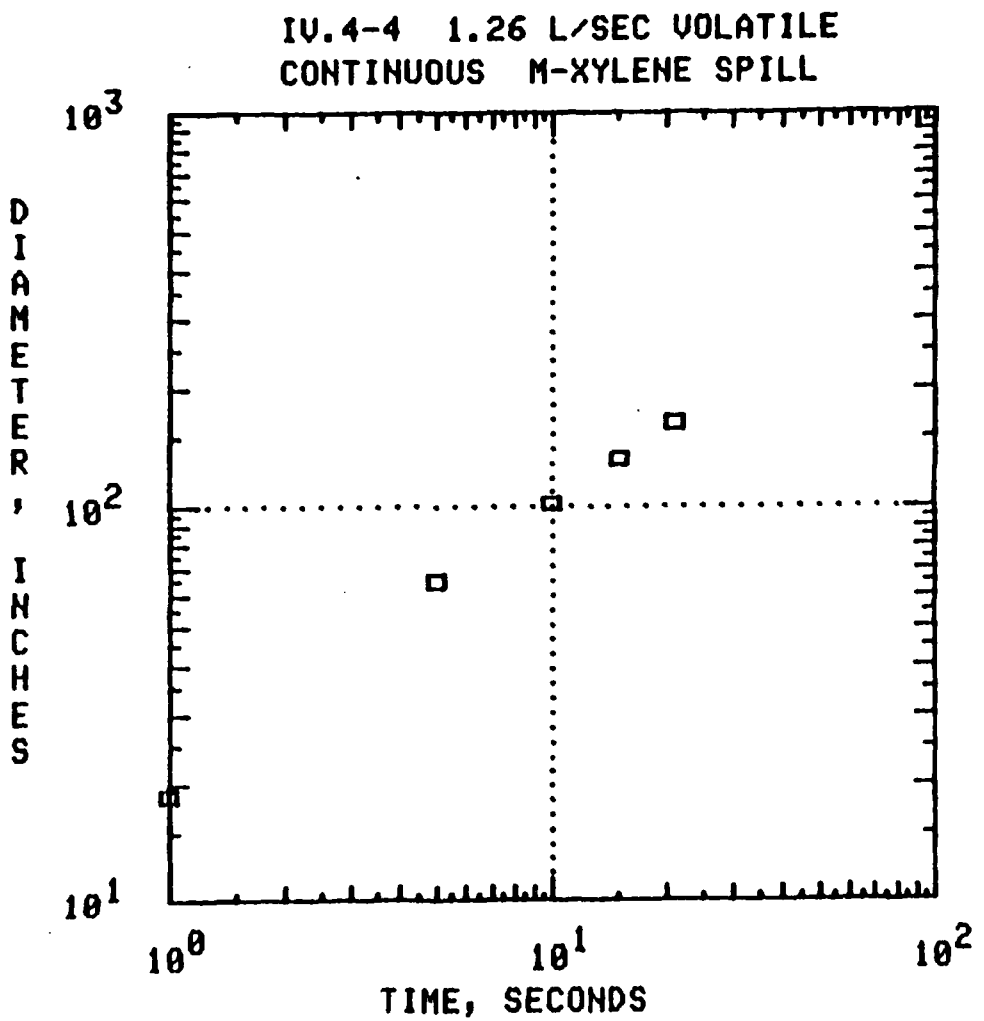

IV.3-3 1.01 L/SEC VOLATILE
CONTINUOUS OCTANE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

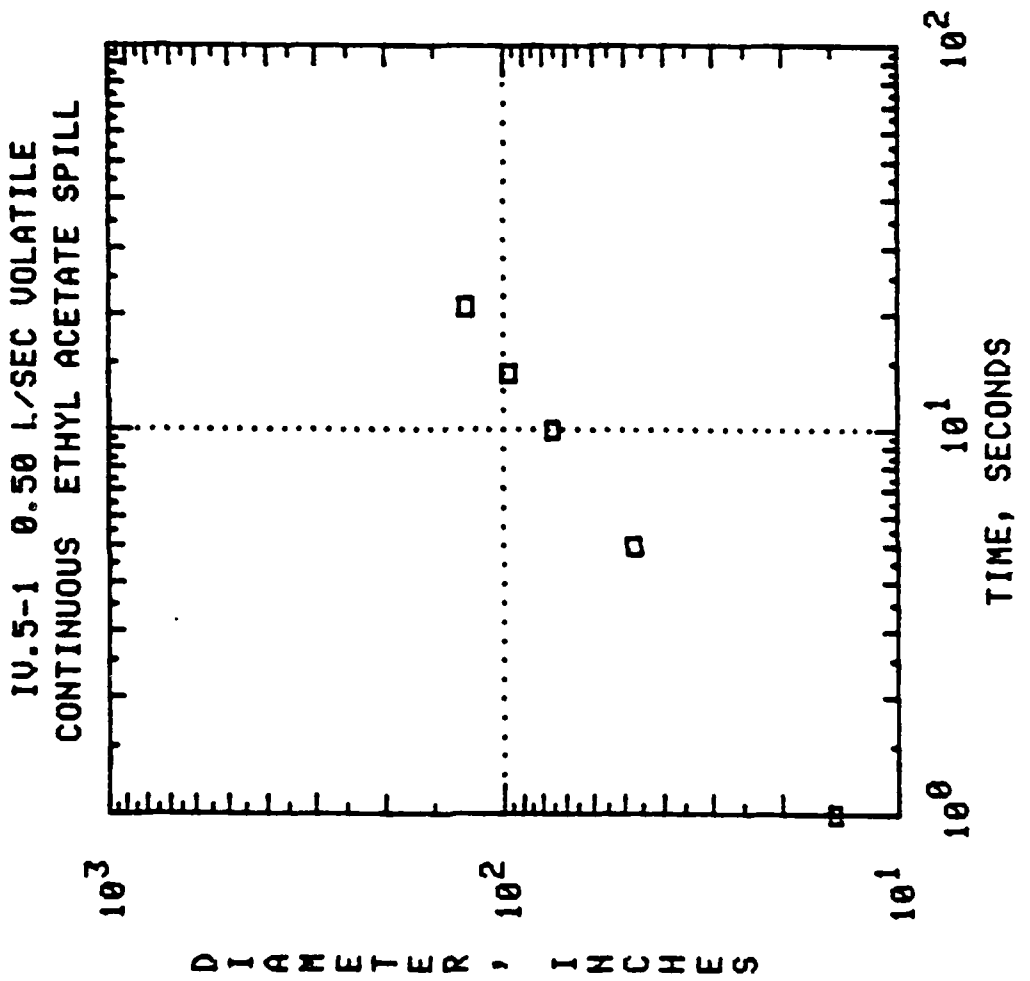

IV.3-4 1.26 L/SEC VOLATILE
CONTINUOUS OCTANE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS

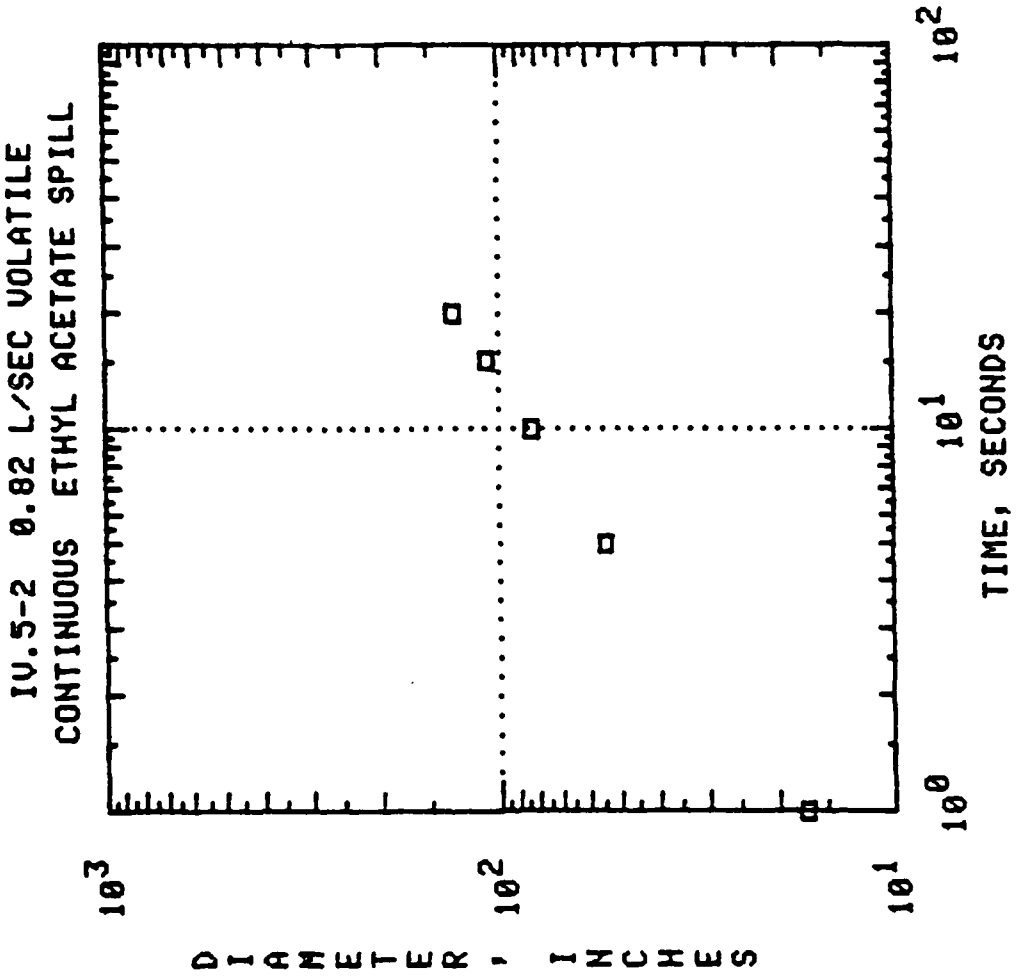

IV.4-1 0.50 L/SEC VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

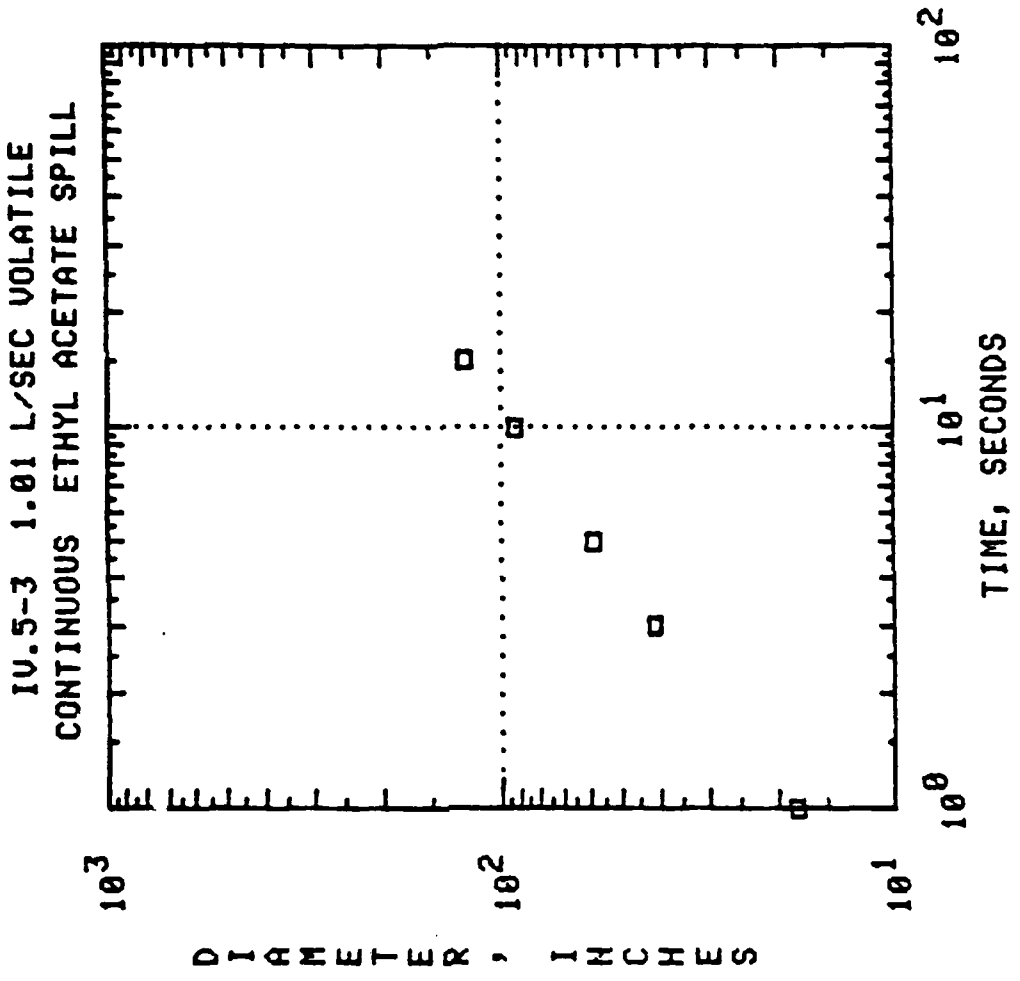

IV.4-2 0.82 L/SEC VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

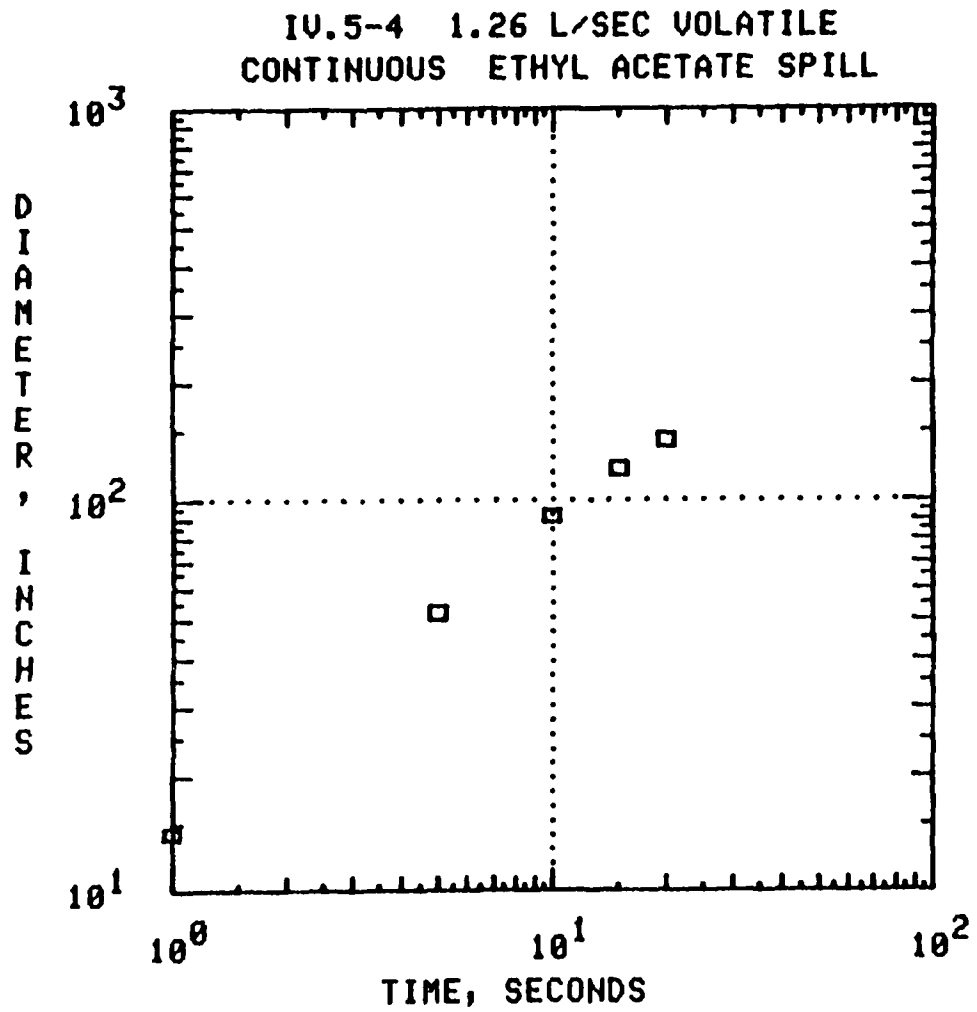

IV.4-3 1.01 L/SEC VOLATILE
CONTINUOUS M-XYLENE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


IV.4-4 1.26 L/SEC VOLATILE
CONTINUOUS M-XYLENE SPILL
10^3
10^2
10^1
DIAMETER, INCHES
10^0
10^1
10^2
TIME, SECONDS


IV.5-1 0.50 L/SEC VOLATILE
CONTINUOUS ETHYL ACETATE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


IV.5-2 0.82 L/SEC VOLATILE
CONTINUOUS ETHYL ACETATE SPILL
DIAMETER - INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2


IV.5-3 1.01 L/SEC VOLATILE
CONTINUOUS ETHYL ACETATE SPILL
DIAMETER, INCHES
TIME, SECONDS
10^3
10^2
10^1
10^0
10^1
10^2

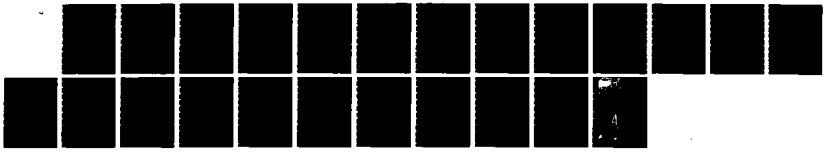

IV.5-4 1.26 L/SEC VOLATILE
CONTINUOUS ETHYL ACETATE SPILL
DIAMETER, INCHES
10^3
10^2
10^1
10^0
10^1
10^2
TIME, SECONDS

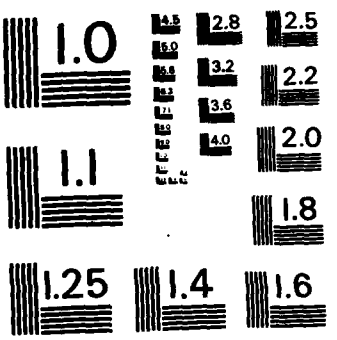
APPENDIX E

SPREADING TEST SERIES V - FLOW CHANNEL TESTS

AD-A139 384 REVISION AND EXPERIMENTAL VERIFICATION OF THE HAZARD ASSESSMENT COMPUTER (U) SOUTHWEST RESEARCH INST SAN ANTONIO TX F T DODGE ET AL. JUN 83 USCG-D-36-83 2/2

UNCLASSIFIED DTCG23-80-C-20026 F/G 13/2 NL

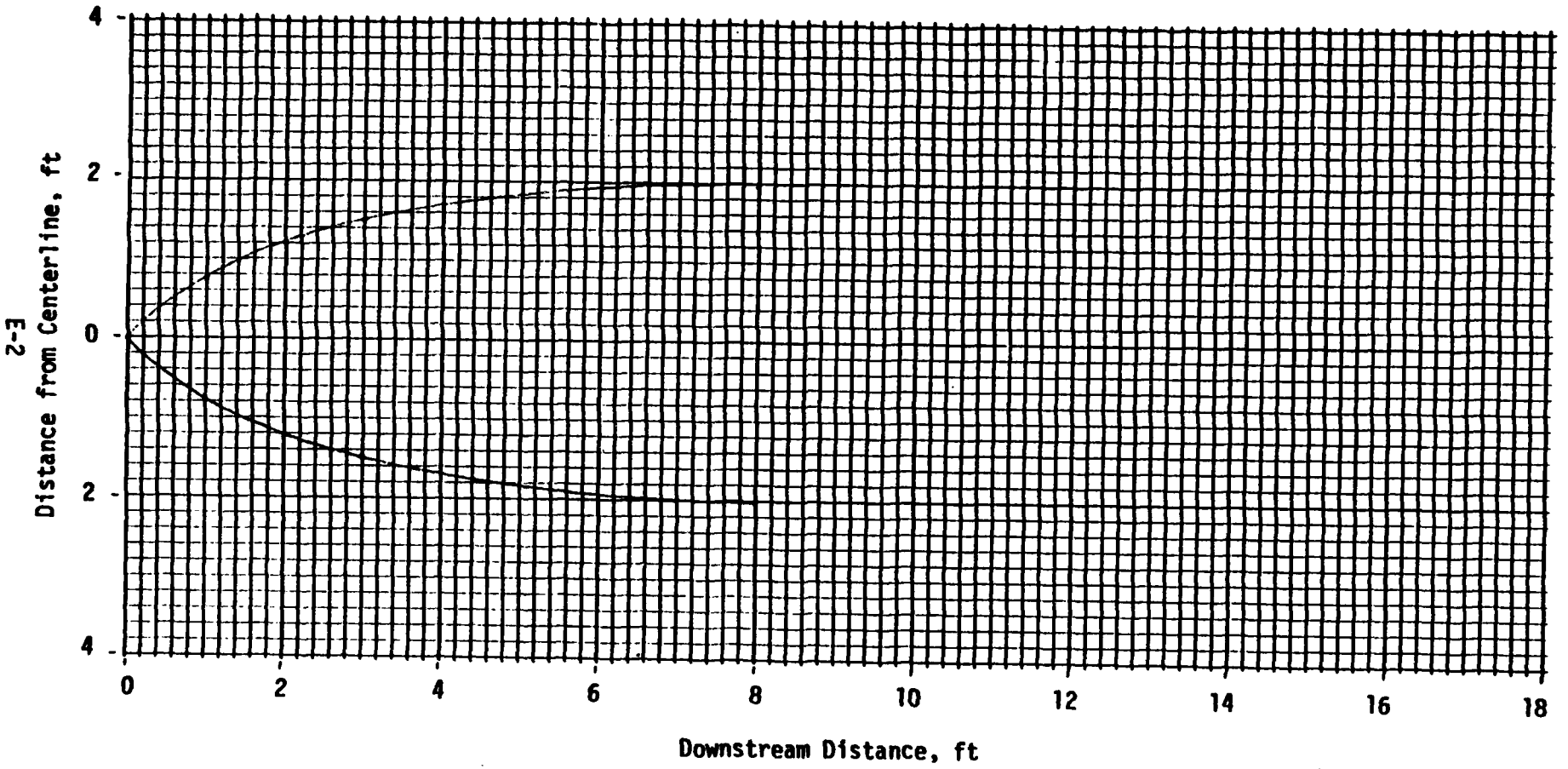




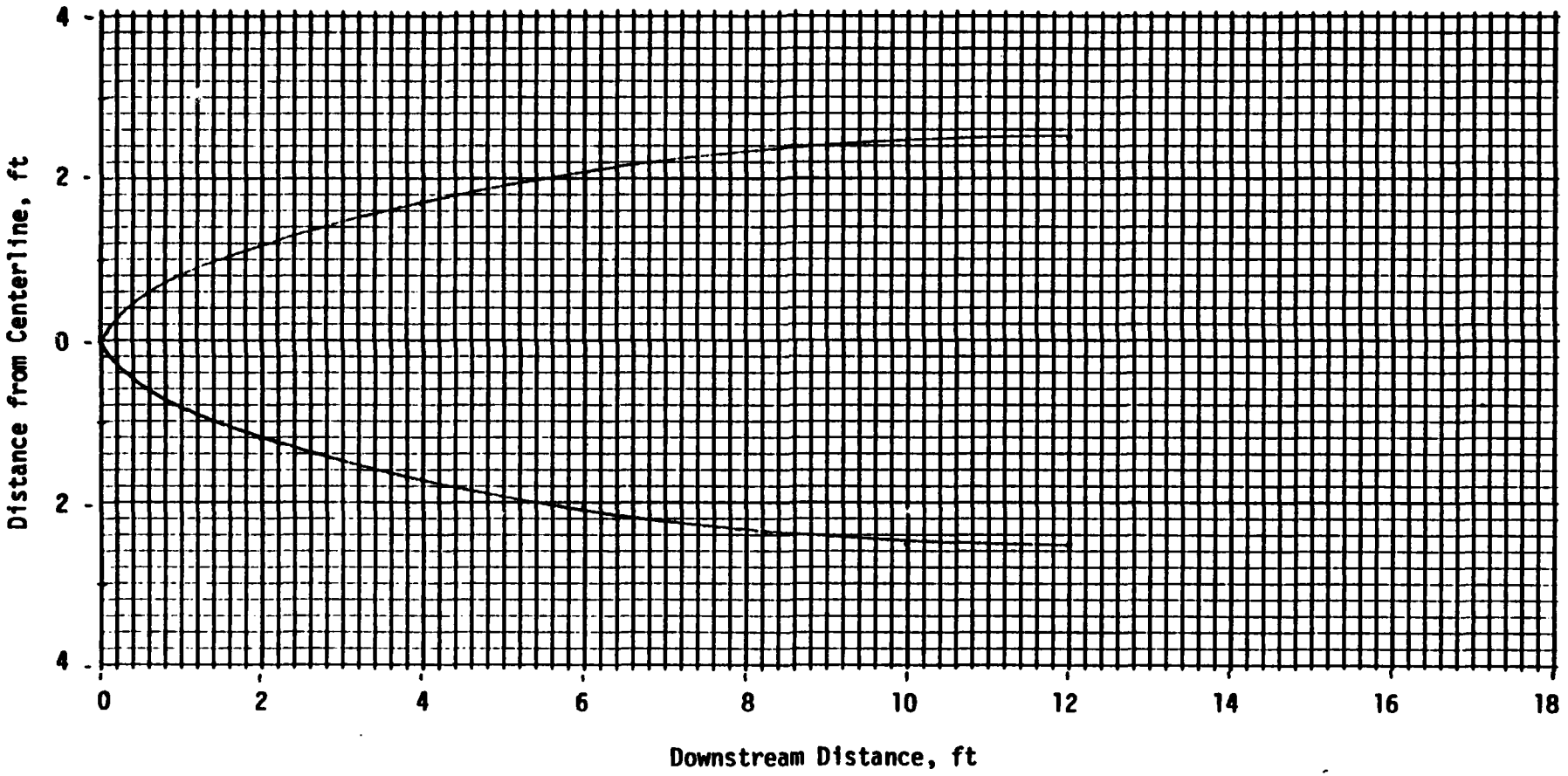
SUMMARY OF TEST CONDITIONS FOR
SPREADING TEST SERIES V -
FLOW CHANNEL TESTS

Run Number	Chemical (Sp.Gravity)	Spreading Coefficient (dyne/cm)	Discharge Rate (liters/sec)	Current m/sec
V.1-1	Octane (0.703)	0.3	0.038	0.134
V.1-2			0.050	0.189
V.1-3			0.100	0.241
V.1-4			0.149	0.290
V.2-1	Kerosene (0.795)	-2.7	0.038	0.134
V.2-2			0.050	0.189
V.2-3			0.100	0.241
V.2-4			0.149	0.290
V.3-1	n-Hexanol (0.819)	39.75	0.038	0.134
V.3-2			0.050	0.189
V.3-3			0.100	0.241
V.3-4			0.149	0.290
V.4-1	Naphtha (0.785)	7.8	0.025	0.119
V.4-2			0.050	0.189
V.4-3			0.100	0.241
V.4-4			0.100	0.290
V.5-1	m-Xylene (0.864)	7.0	0.038	0.134
V.5-2			0.050	0.189
V.5-3			0.100	0.241
V.5-4			0.149	0.290

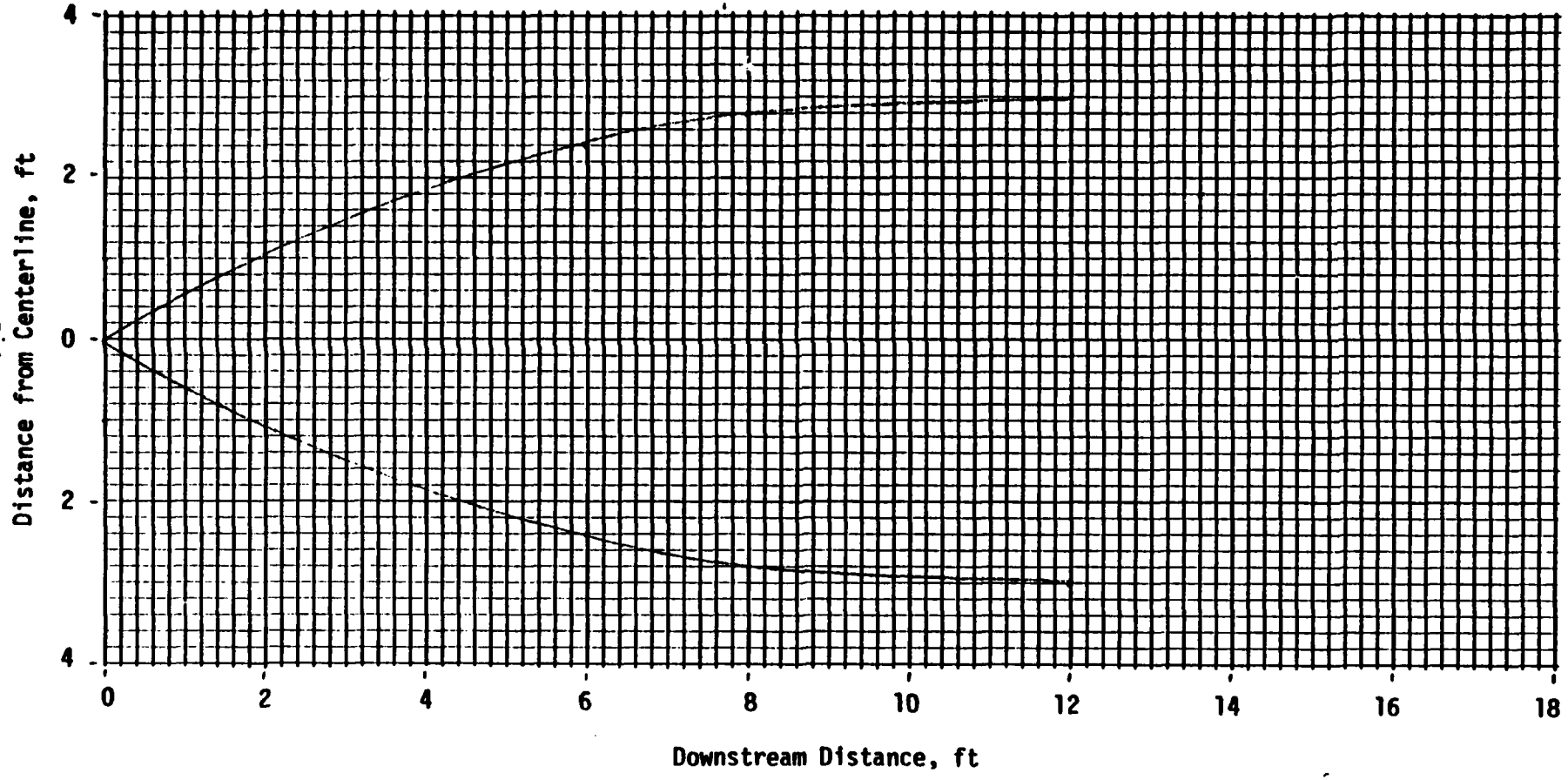
RUN NUMBER V.1-1



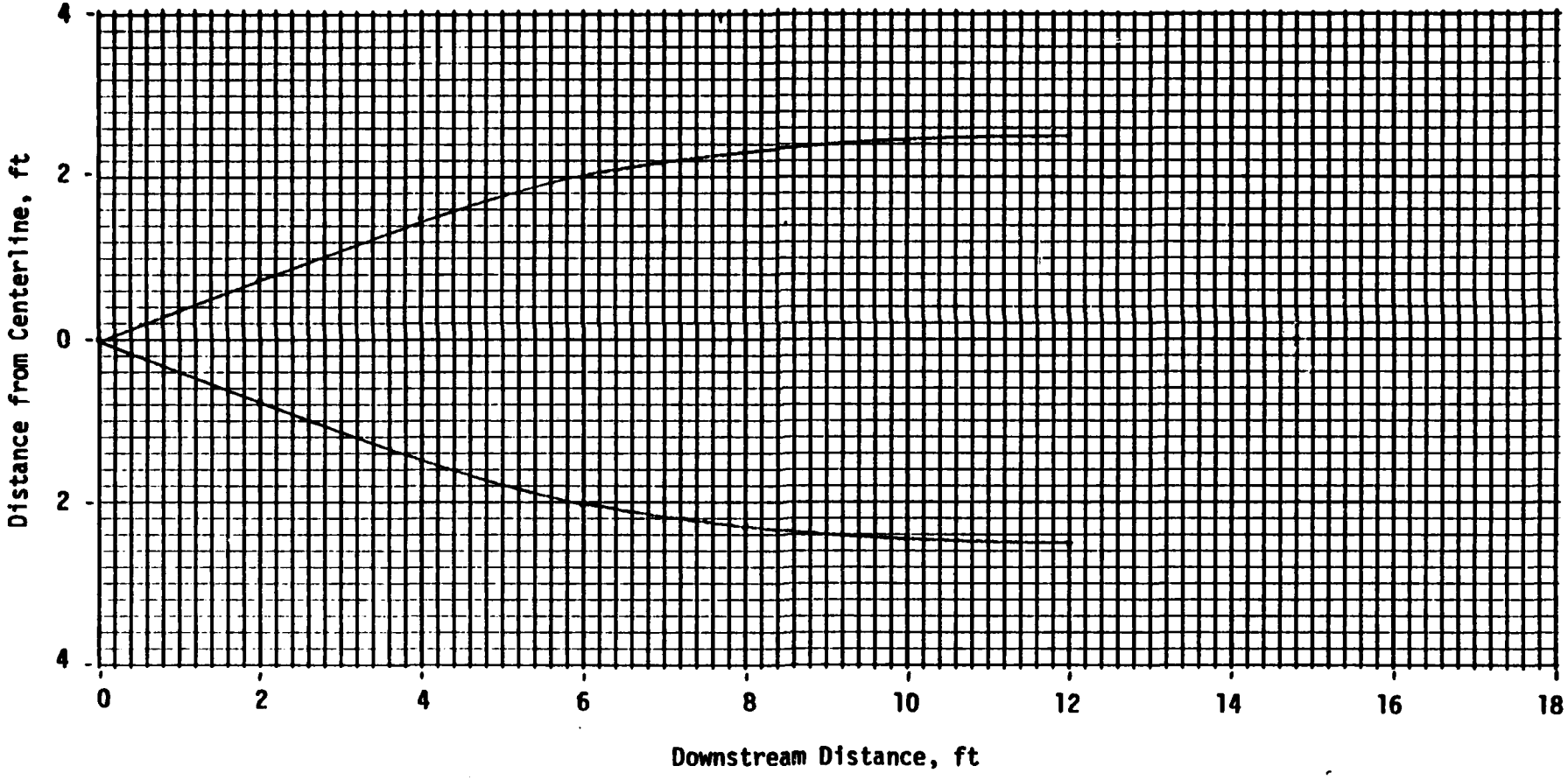
RUN NUMBER V.1-2



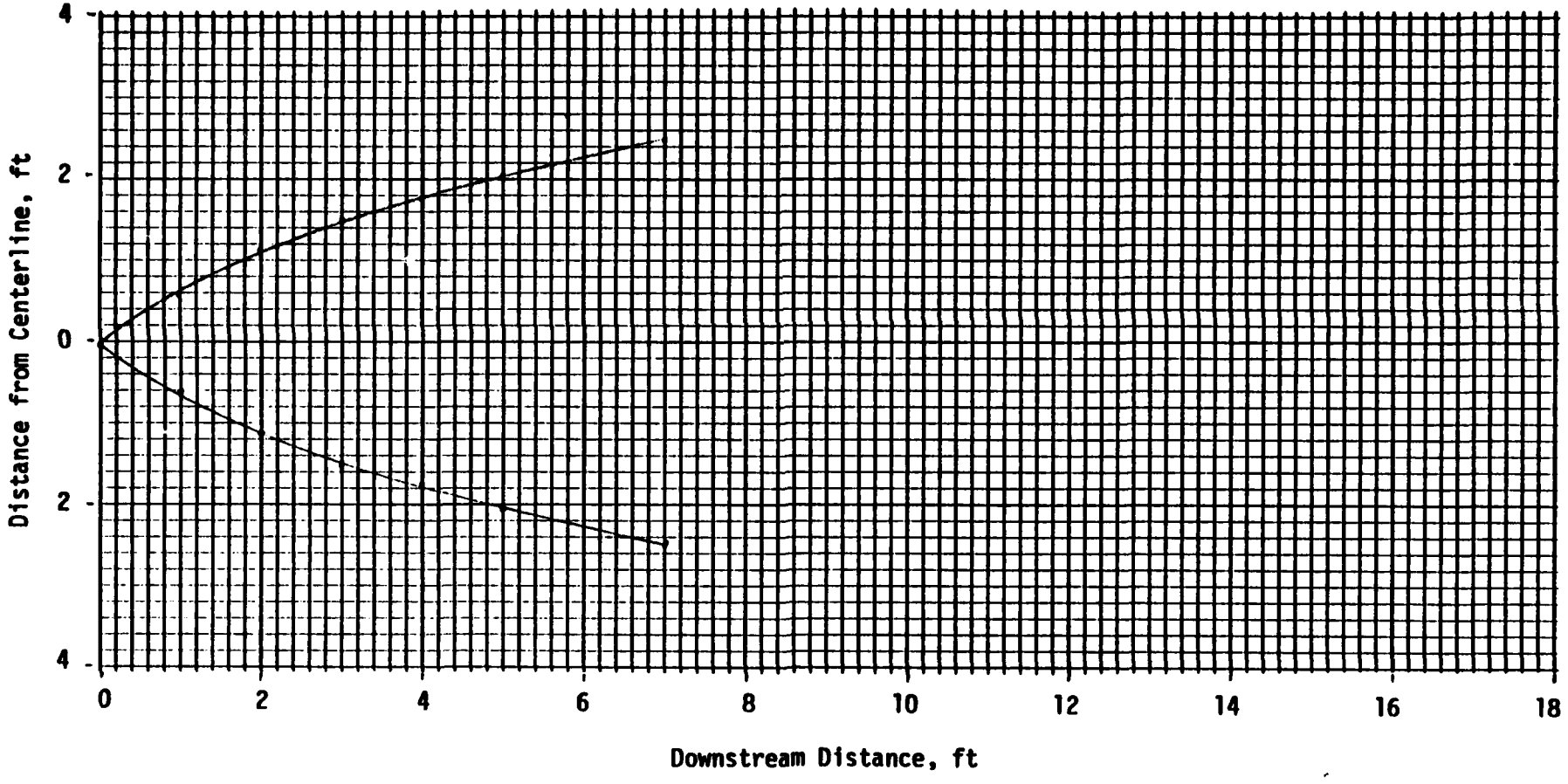
RUN NUMBER V.1-3



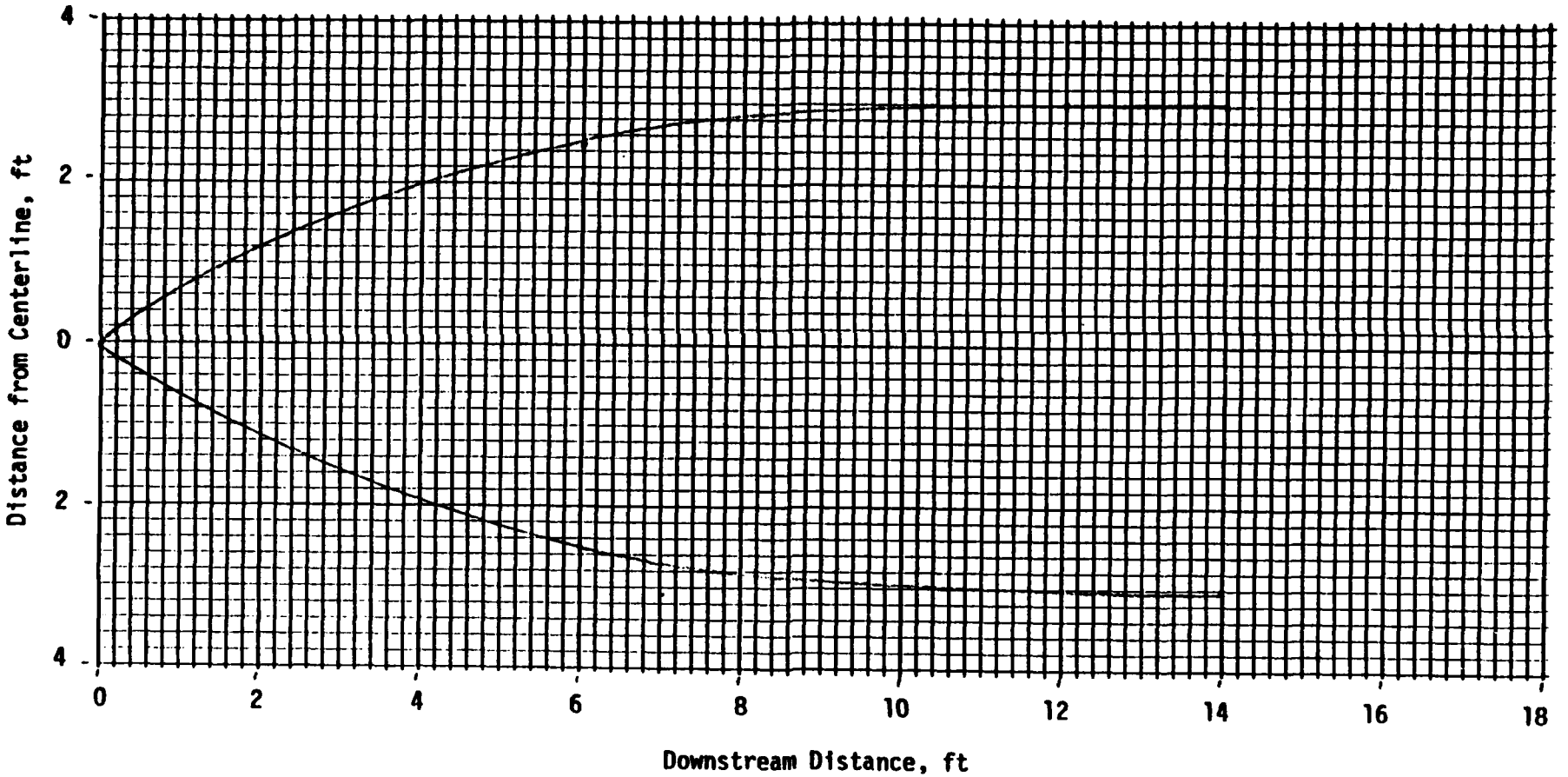
RUN NUMBER V.1-4



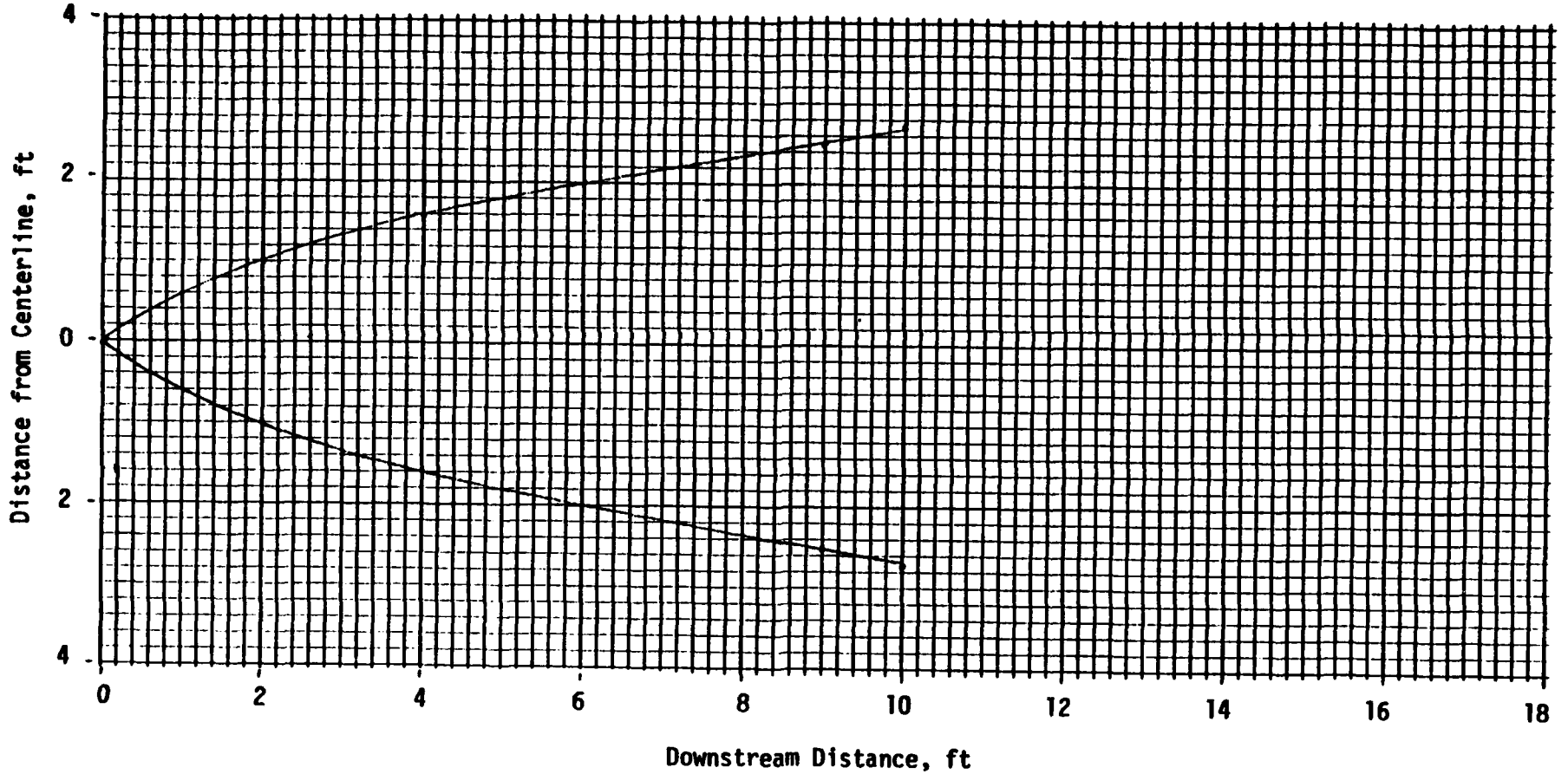
RUN NUMBER V.2-1



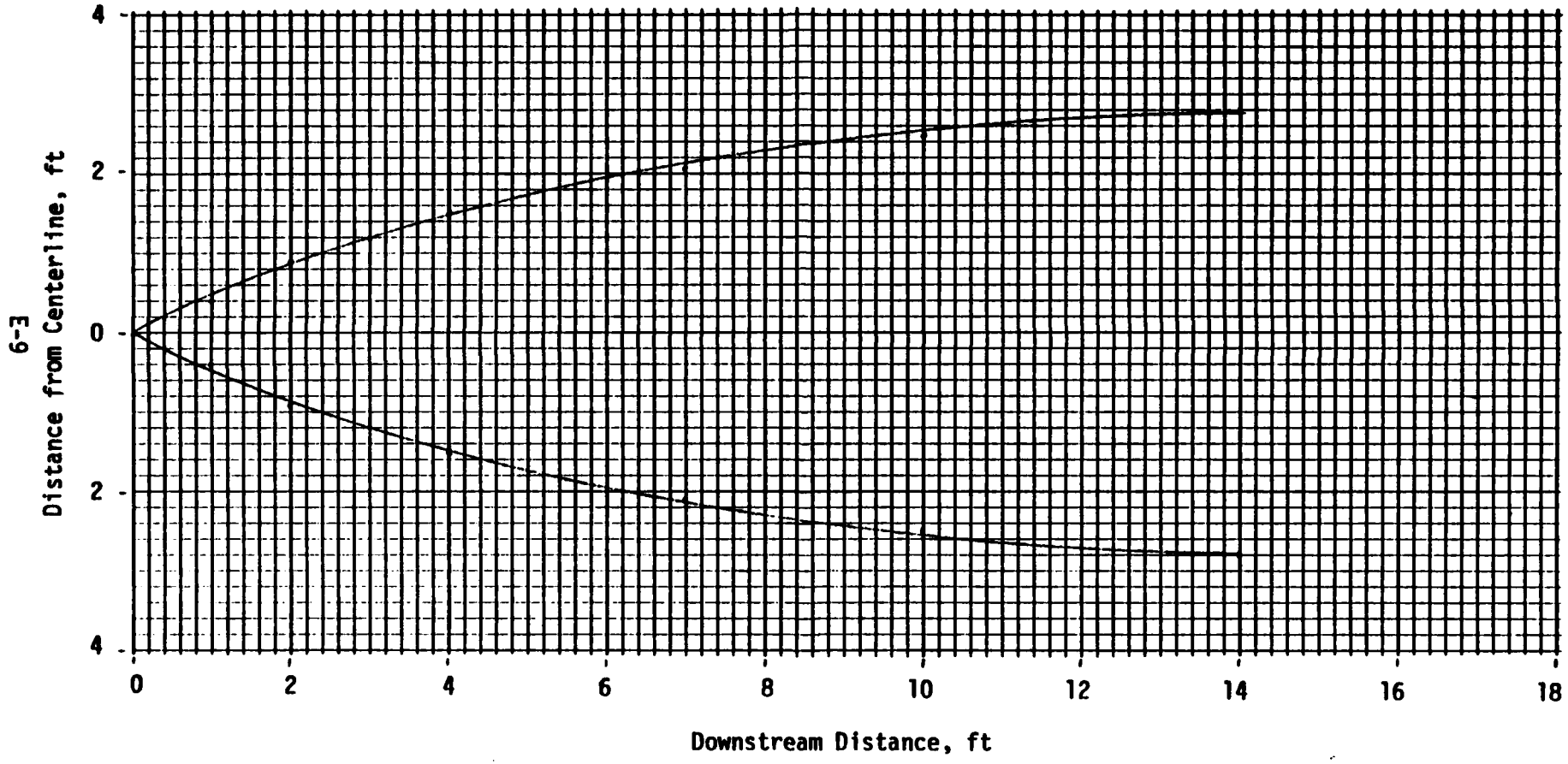
RUN NUMBER V.2-2



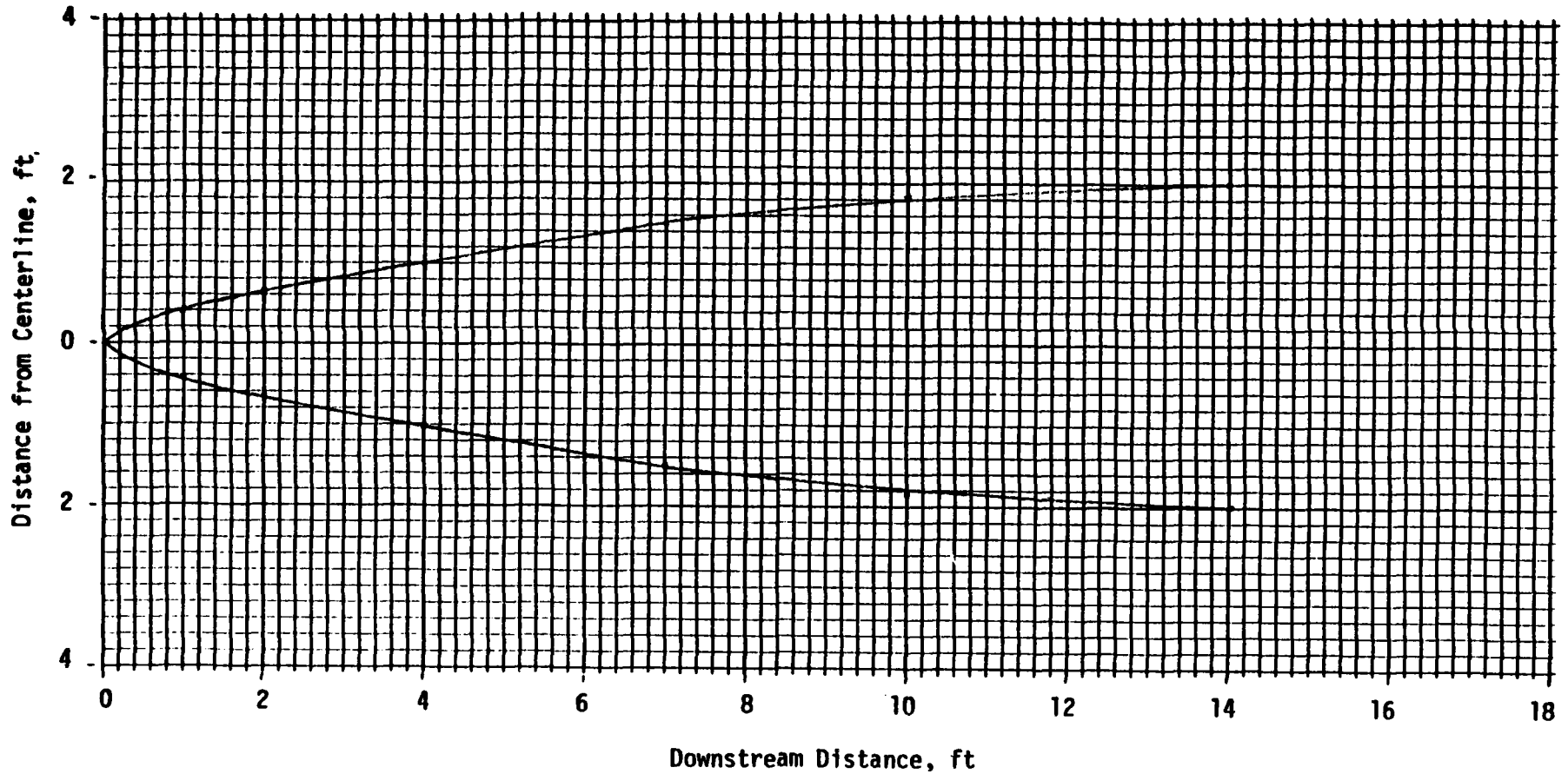
RUN NUMBER V.2-3



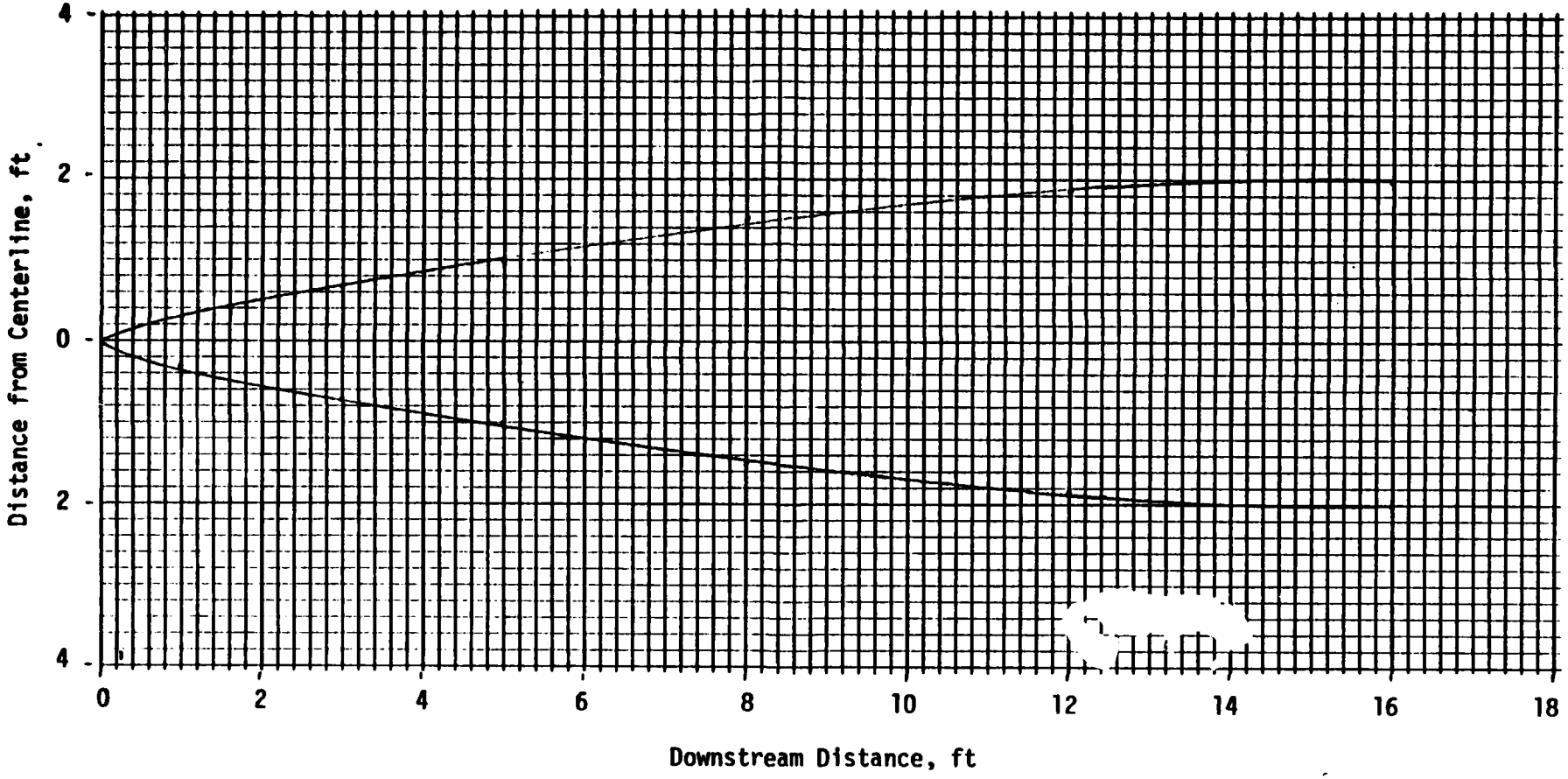
RUN NUMBER V.2-4



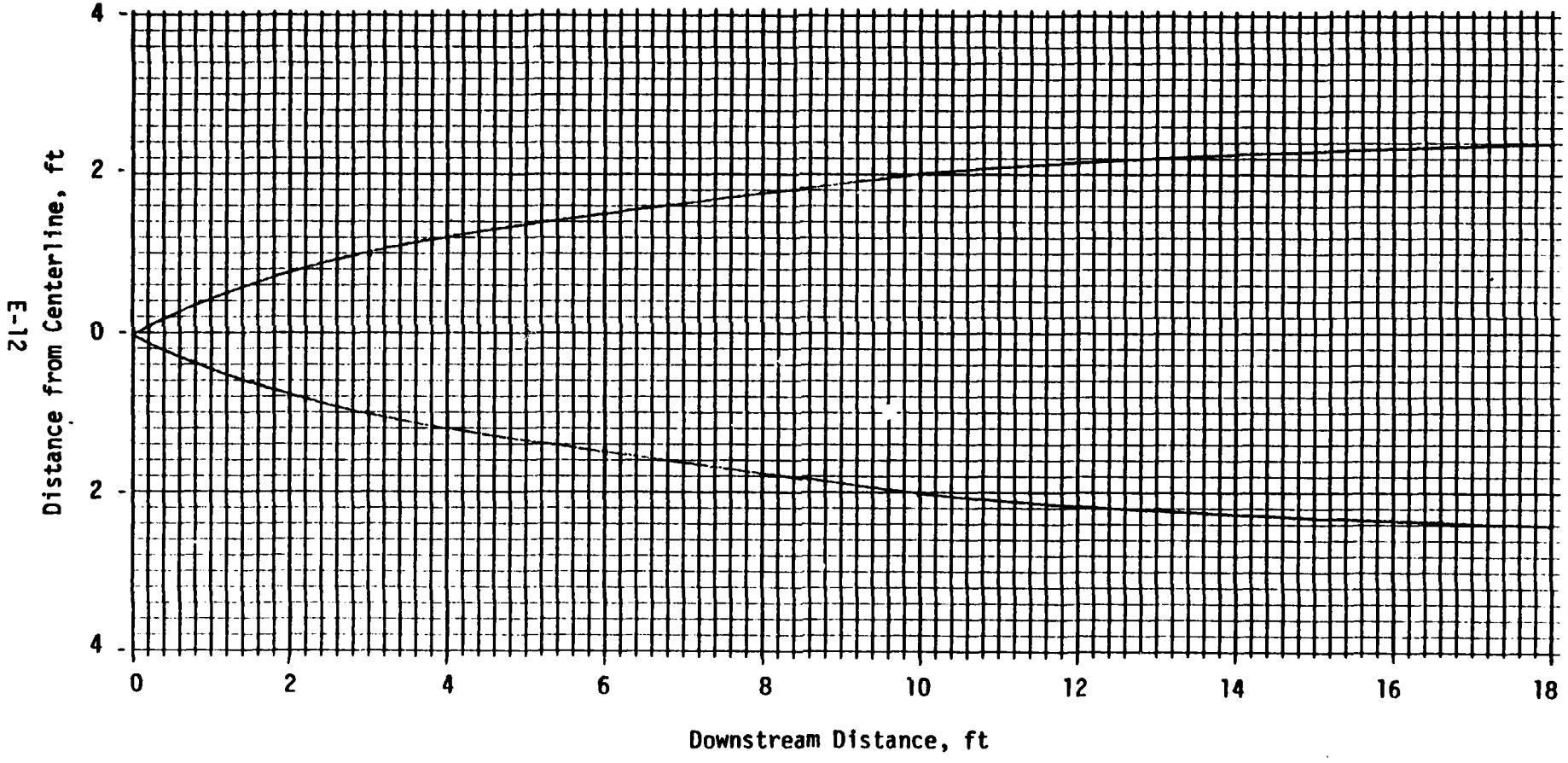
RUN NUMBER V.3-1



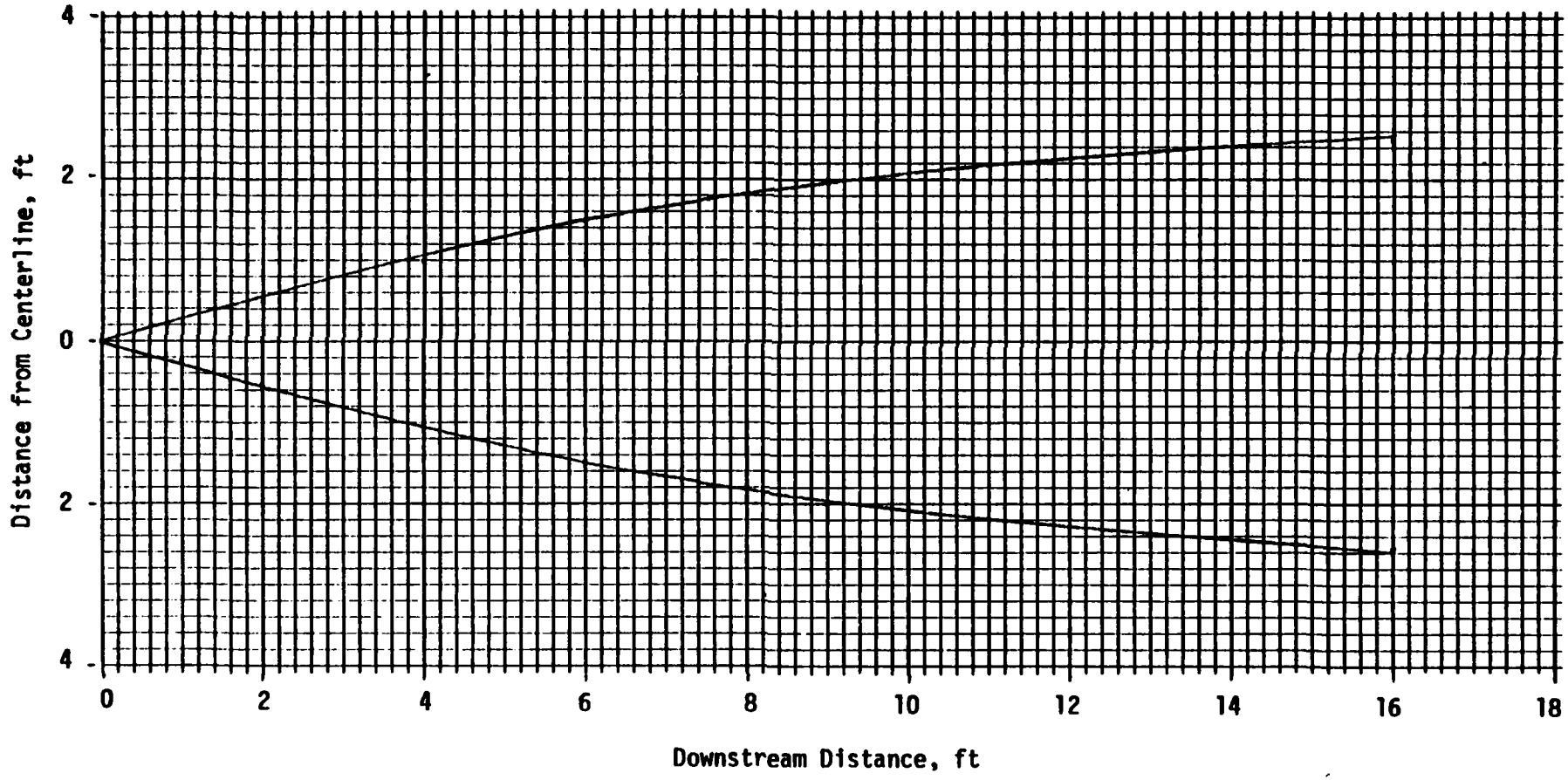
RUN NUMBER V.3-2



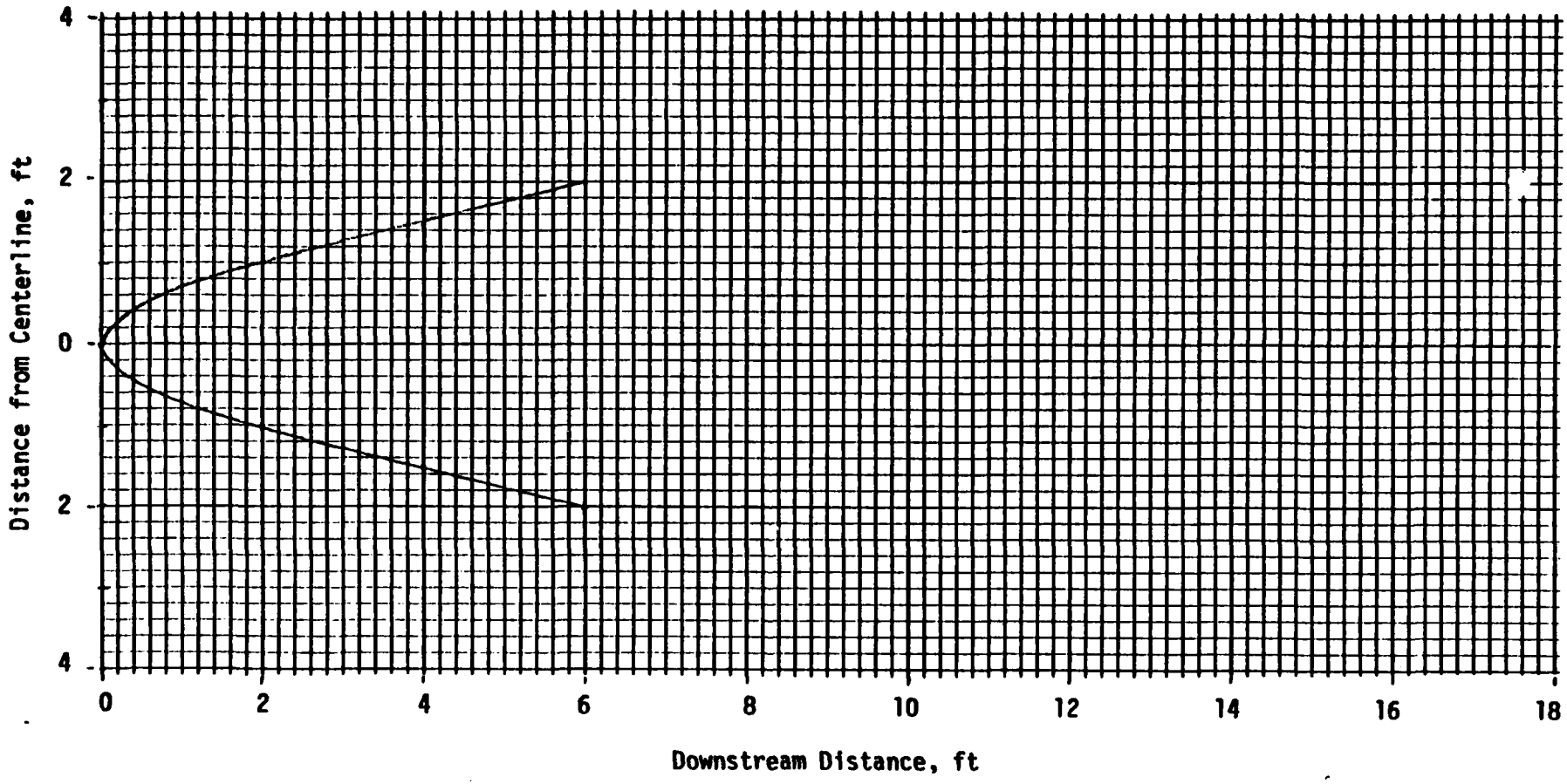
RUN NUMBER V.3-3



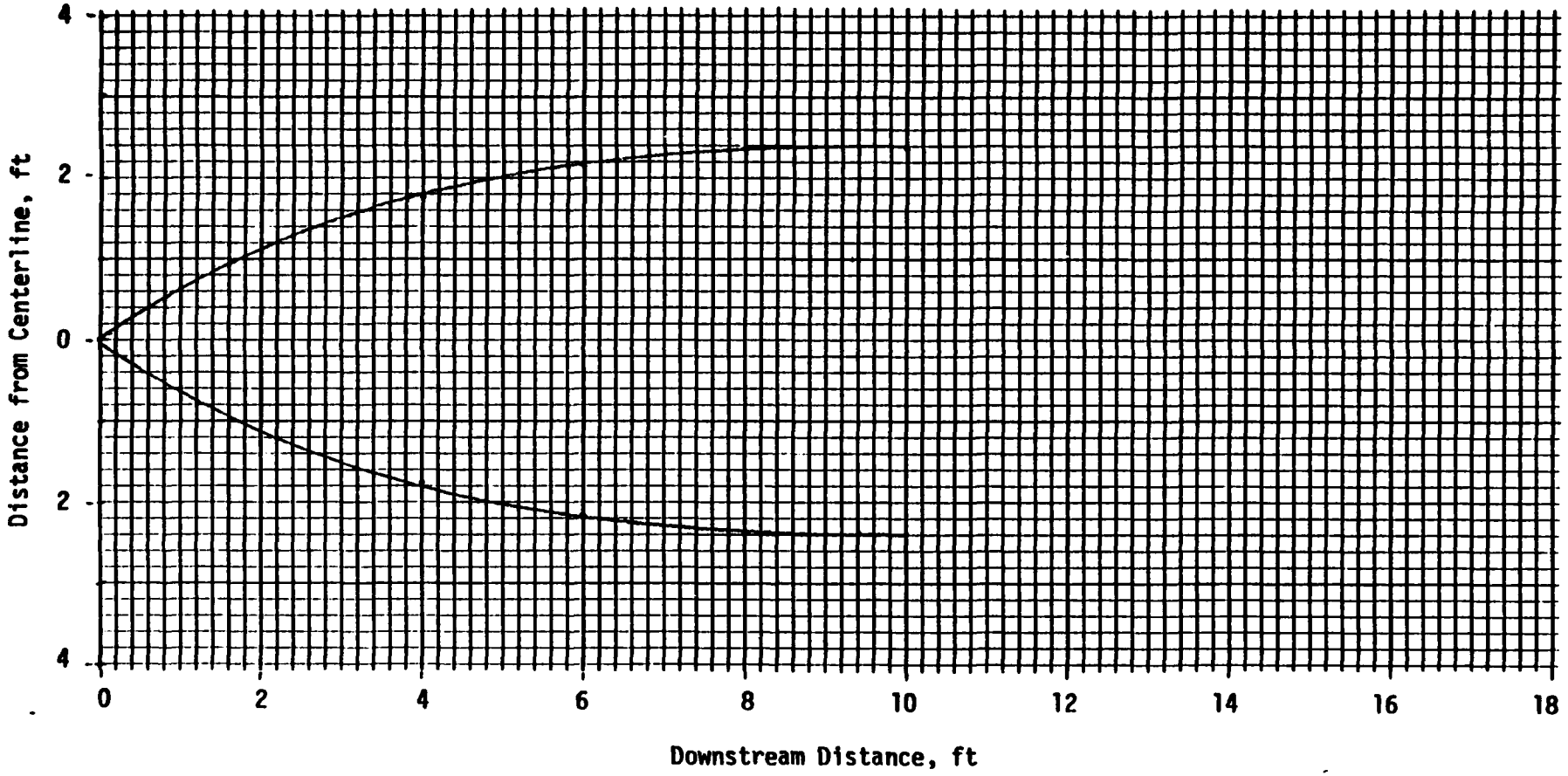
RUN NUMBER V.3-4



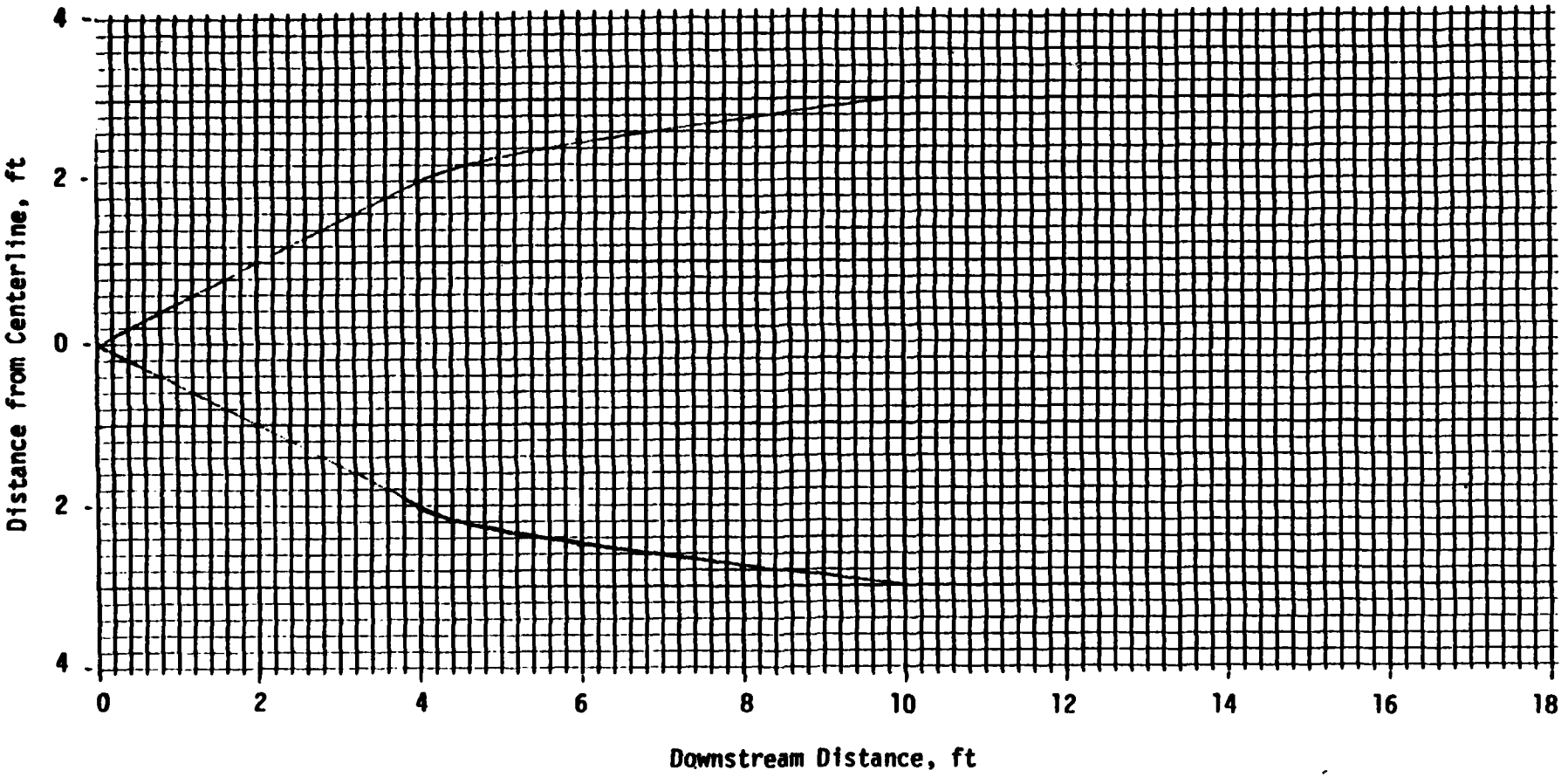
RUN NUMBER V.4-1



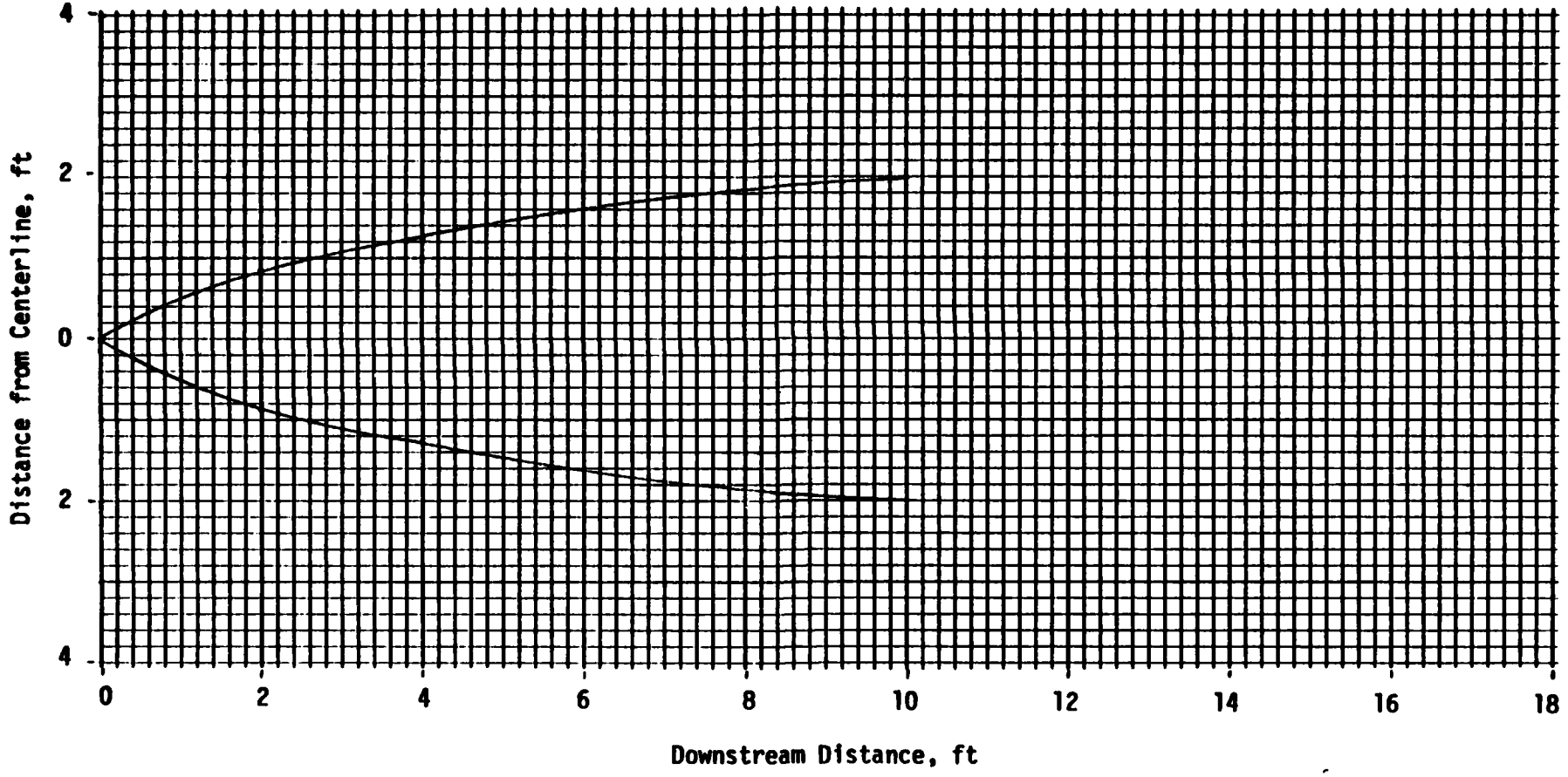
RUN NUMBER V.4-2



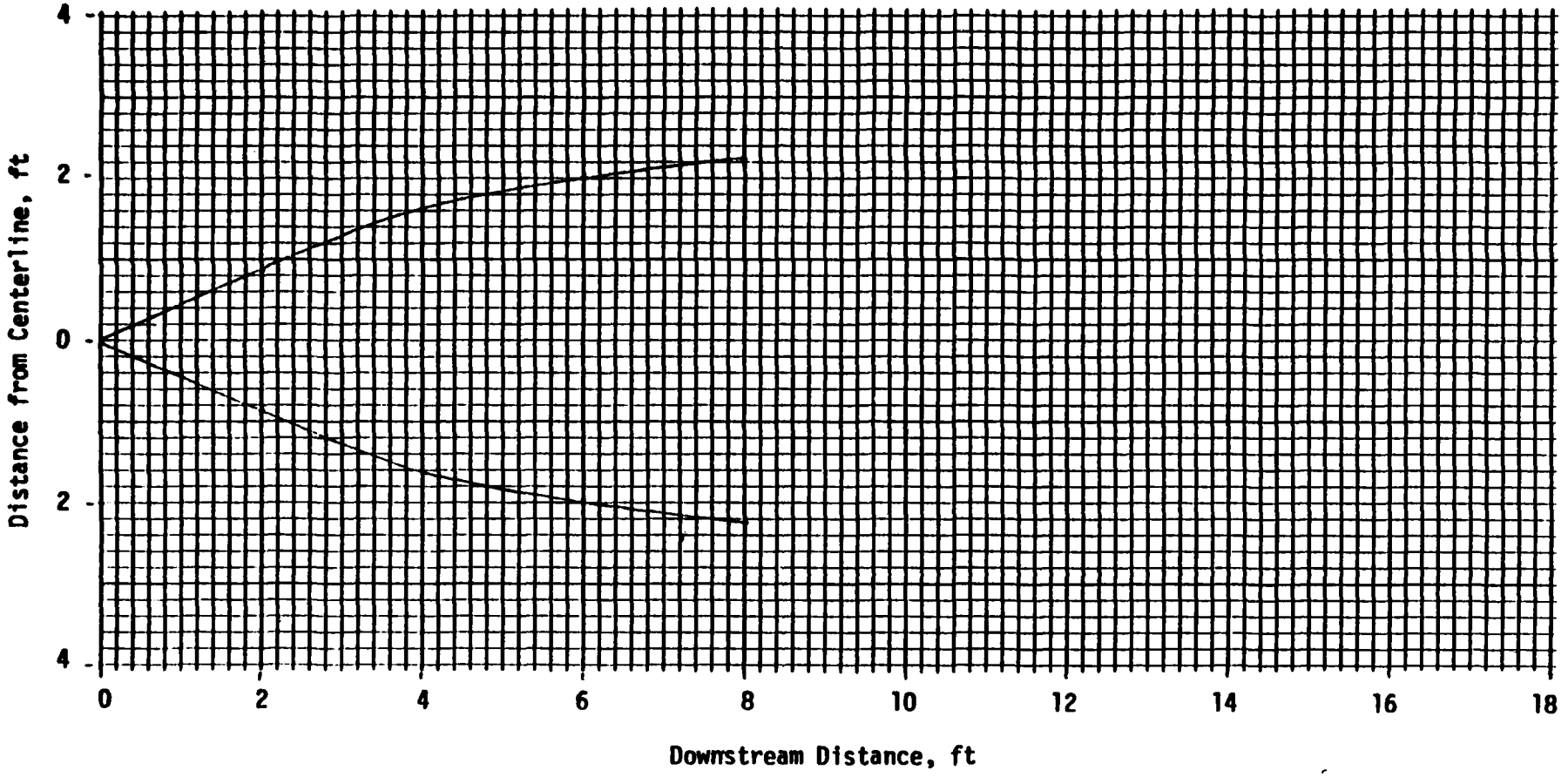
RUN NUMBER V.4-3



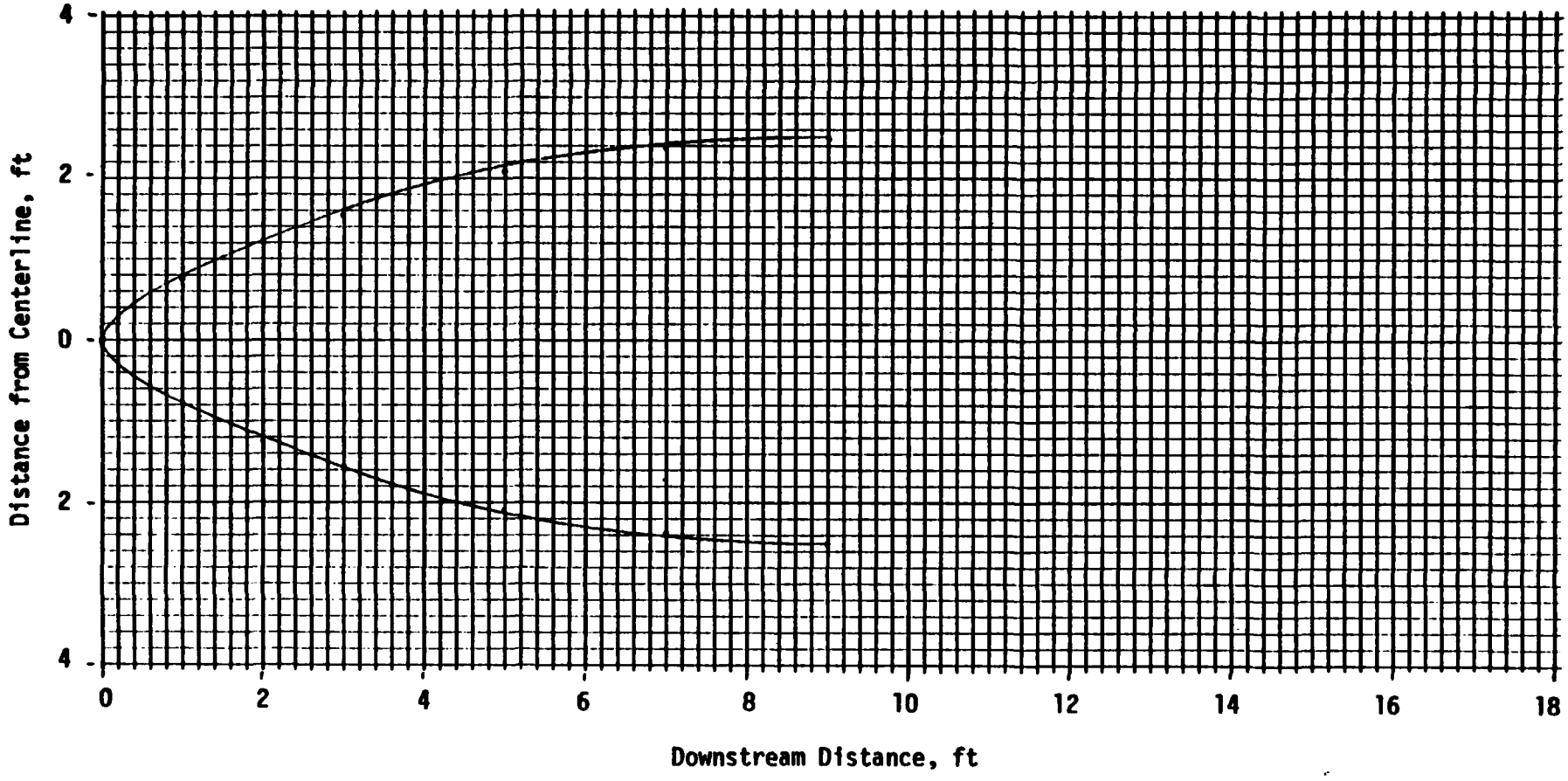
RUN NUMBER V.4-4



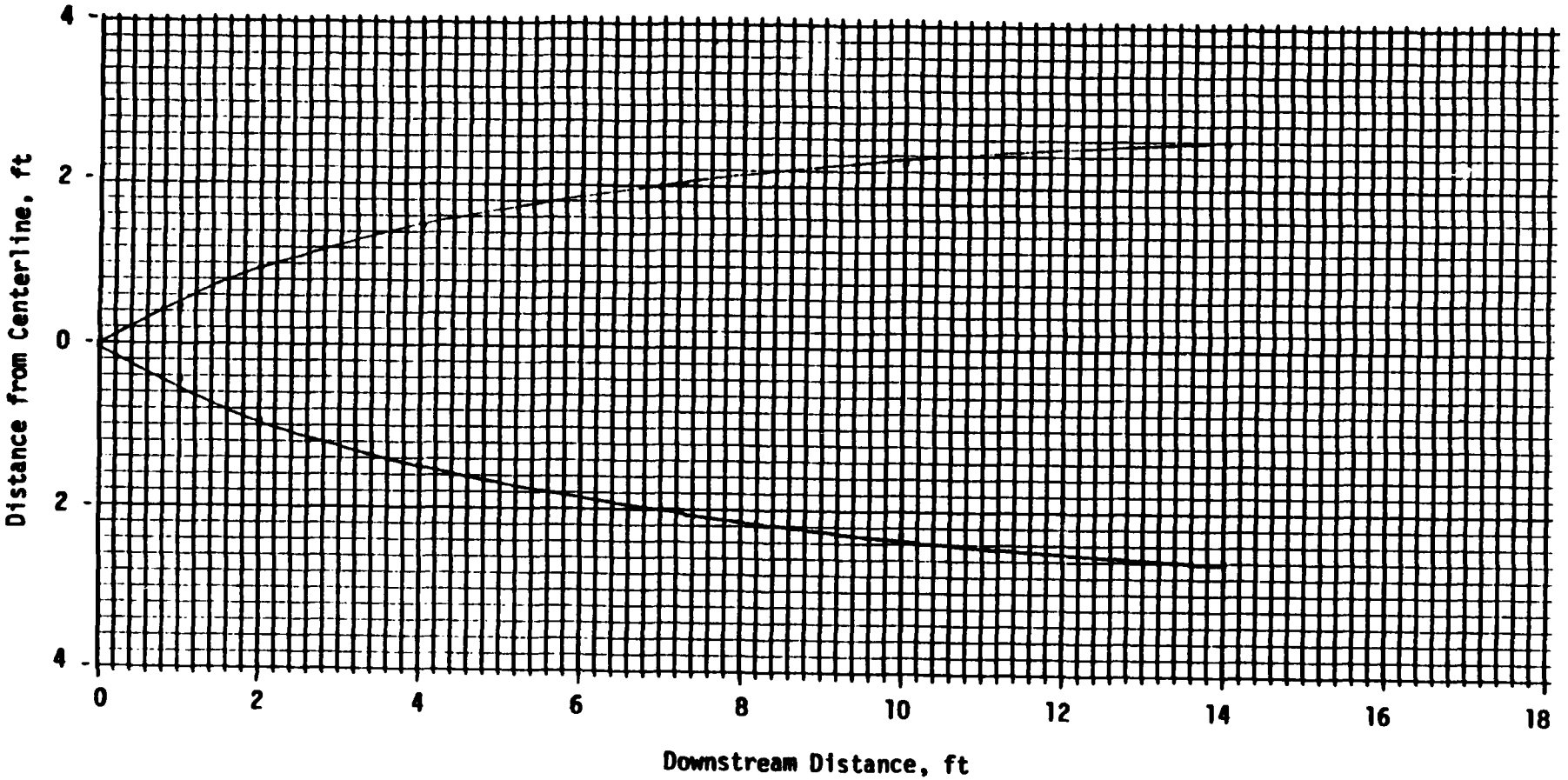
RUN NUMBER V.4-5



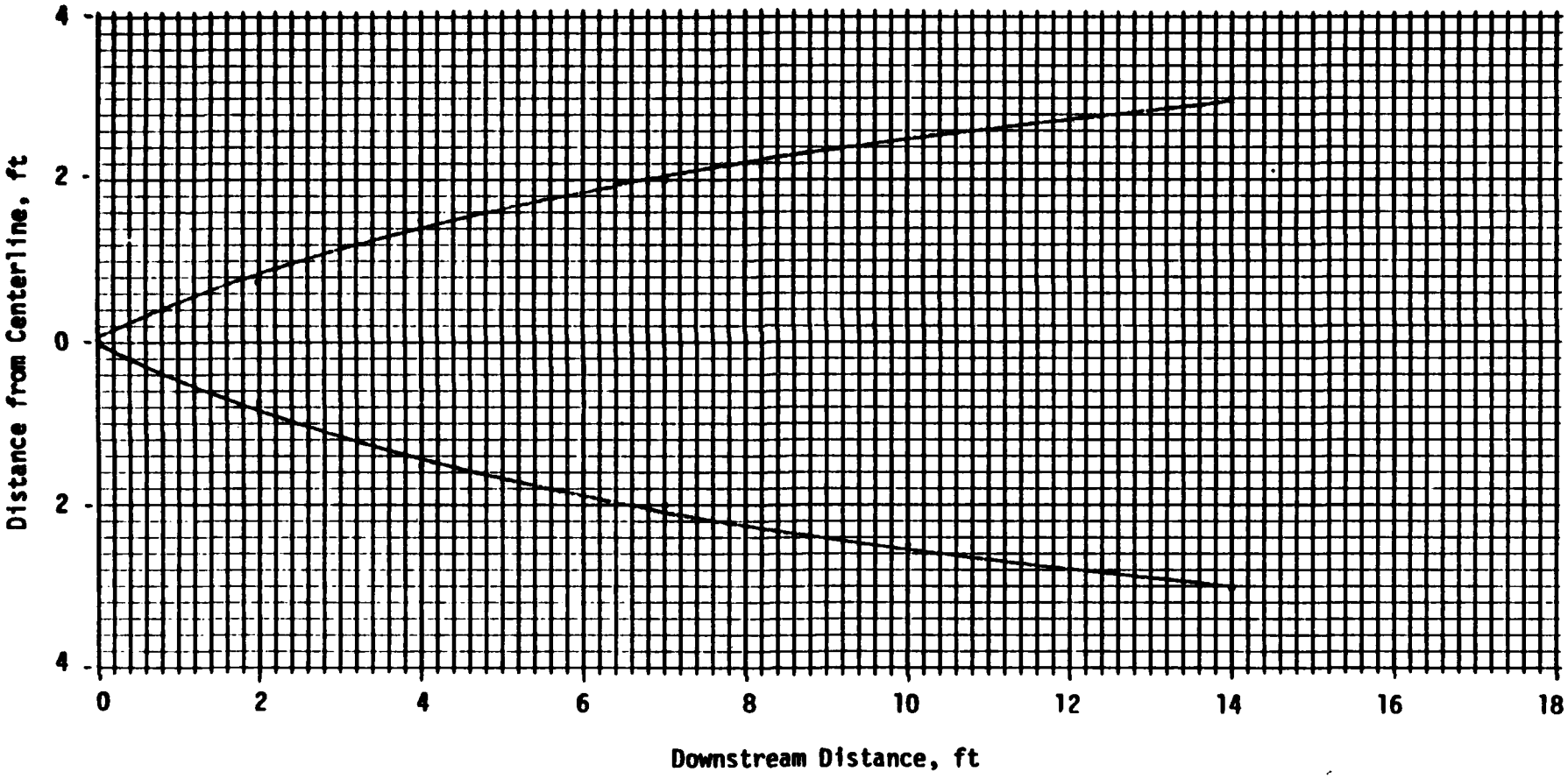
RUN NUMBER V.5-1



RUN NUMBER V.5-2



RUN NUMBER V.5-3



RUN NUMBER V.5-4